

URBAN/MUNICIPAL

CA3 ON HW Q90

M56

1988

MONITORING REPORT ON THE
UPPER OTTAWA STREET
LANDFILL SITE
1988

SUBMITTED TO:

THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
DEPARTMENT OF ENGINEERING
71 MAIN STREET W.
HAMILTON, ONTARIO
L8N 3T4

ATTENTION: MR. G. DYKEMAN

SUBMITTED BY:

MANN TESTING LABORATORIES LTD.
5550 MCADAM ROAD
MISSISSAUGA, ONTARIO
L4Z 1P1

AUGUST 1988

MANN FILE #
PROJECT #

UPPER OTTAWA LANDFILL SITE
GAS MONITORING PROGRAM

14. DT-60-88 - Reconstruction of Main Street West between Cootes Drive and Ewen Road, Hamilton

ENG 88-399
AGENDA #14
BILL NO.1348

Recommendation

- i) That the centre lane of Main Street West be designated as a continuous two-way left turn lane between Cootes Drive and Rifle Range Road.
- ii) That an appropriate By-Law to amend By-Law R76-144 be enacted and forwarded to the Ministry of Transportation.
15. DT-61-88 - Upper Wentworth Street at Limeridge Road in the City of Hamilton - Establishment of a new Bus Stop

ENG 88-400
AGENDA #15

Recommendation

That in accordance with the request of the Hamilton Street Railway Company, the following new bus stop be established:

Upper Wentworth and Upper Wellington Routes - southbound
add - Upper Wentworth Street at Limeridge Road (N/S)

16. DT-62-88 - Upper Paradise Road at Gemini Drive in the City of Hamilton - Bus Stop Relocation

ENG 88-401
AGENDA #16

Recommendation

That in accordance with the request by the Hamilton Street Railway Company, the following bus stop relocation be approved:

Upper Paradise Route - northbound - delete - Upper Paradise Rd.
at Gemini Dr. (N/S)
-add - Upper Paradise Road at
Gemini Drive (F/S)

17. Upper Ottawa Street Landfill Site
3 Year Gas Monitoring Programme

ENG 88-402
AGENDA #17

Recommendation

- i) The results of the three-year Upper Ottawa Landfill Site Gas Monitoring Programme be received and endorsed by the Committee.

17. Cont'd...

- ii) The Upper Ottawa Street Landfill Site Gas Monitoring Programme be discontinued as an independent monitoring programme in view of the decreasing presence of the studied chemicals in the landfill gas and the overall stability of the air surrounding the site.
- iii) A modified monitoring programme for trace organics be incorporated under the environmental monitoring programme of the proposed Landfill Gas Control System.
- iv) Copies of the Upper Ottawa Landfill Site Gas Monitoring Report be forwarded to the local branch of the Ministry of the Environment and the Upper Ottawa Citizens Committee for their information, and to Conestoga-Rovers & Associates Ltd. for their consideration in the design and implementation of the Landfill Gas Control System.

18. Change Order No. 1 - Contract RHW-88-40(HSW) - Installation of Catch Basins and Catch Basin Drains at Chedoke Civic Golf Course

ENG 88-407
AGENDA #18

Recommendation

That Change Order No. 1 in favour of Cardeen Construction Limited, in the amount of \$35,878.00, which increases Contract RHW-88-40(HSW) from the approved amount of \$1,101,103.50 to \$1,136,981.50 be approved and added to Contract RHW-88-40(HSW) and be charged to City of Hamilton Budget Account No. 0404-38004.

19. Accelerated Storm Sewer Program

ENG 88-406
AGENDA #D-1

Recommendation

Whereas Regional Council at its meeting of September 20, 1988 directed the Engineering Department to prepare a remedial action plan for eliminating flood prone areas through the accelerated reconstruction of sewer systems.

It is therefore recommended:

- i) That the Region shall attempt to complete the following works five years.

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1.0 INTRODUCTION

In September 1985, Mann Testing Laboratories was contracted by the Regional Municipality of Hamilton-Wentworth to conduct a 3 year study on the concentration levels of selected volatile organics emanating from the bore hole, test well and gas probes at the Upper Ottawa Street Landfill site. In addition, corresponding concentration levels of these organics were also monitored in ambient air surrounding the landfill site.

In this study, three sampling sites were selected for ambient air testing: these included one upwind, one downwind and one site located centrally to the landfill area. The site locations are referred to in this report as #1 west, #2 central and #3 east respectively. A number of gas vents were also selected to determine the flow of gases. These vents are identified as "Test Well", Probe 2A, Borehole and Probe 4. Their locations are depicted in the Landfill Map (Appendix C).

The weather and wind direction on the sampling day were also recorded to help interpret the data. These data, in combination with concentration levels detected, provide a clear profile of the air quality in Upper Ottawa Landfill Site.

This report summarizes the data obtained during the period of October 1985 to April 1988. During these 3 years, the concentration levels of VOC's in ambient air remained quite stable. However, in some test wells, the levels were noted to drop significantly.

2.0 EXPERIMENTAL

2.1 Summary of Analytical Method

In order to detect volatile organics present at very low concentrations (ppb or below), adsorption thermal desorption/gas chromatography/mass spectrometry technique (ATD/GC/MS) was used. This technique allows the pre-concentration of organics from a large volume of air sample, using a sorbent cartridge. The cartridge is then returned to the laboratory where it is thermally desorbed. The volatile organics were then analysed using gas chromatography/mass spectrometry. Due to the increased sensitivity of this method, trace levels of VOC's are easily detected.

2.2 Materials

Sorbent tube cartridges constructed of pyrex glass (20 cm x 6 mm OD and 4 mm ID) and packed with sequential layers of glass beads, Tenax, Ambersorb XE-340 and charcoal adsorbents were obtained from Envirochem Inc. (Kemblesville, Pa.). Prior to use the packed sorbent tubes were cleaned by heating to 290°C in a sorbent tube conditioner while being purged with high purity nitrogen at a flow rate of 50 ml/min.

Grab bags (2 Liters) fabricated of mylar and equipped with a septum and valve were acquired from Levitt Safety (Toronto, Ont.). The bags were flushed with ultra high grade nitrogen, before each sampling.

Analytical standards were obtained from Aldrich Chemicals (Milwaukee, Wis.), Chem Service (West Chester, Pa.) and BDH Chemicals (Toronto, Ont.).

2.3 Apparatus

Analyses were performed using a modified Envirochem Model 780B concentrator, interfaced to a Hewlett Packard Model 5890 gas chromatograph, coupled to a Finnigan Model 3300 mass spectrometer. An Envirochem automatic desorber unit was attached to the concentrator, with a separate module controlling the temperature and timing of the process. Desorption conditions were: transfer lines at 280°C; initial purge time of 2 min; sorbent tube desorbed at 270°C for 12 min with helium flow of 50 ml/min; trapping time for gaseous injections 3 min; traps 1 and 2 desorbed at 300°C with flows of 50 and 2 ml/min respectively onto a J&W DB-5 fused silica capillary column (30 m x 0.25 mm, 1 µm film thickness) maintained at 40°C. The GC conditions were: Helium carrier gas flow of 1.5 ml/min; initial temperature at 40°C for 5 min; temperature program rate of 8°C/min; final temperature 280°C; final hold time 20 min.

2.4 Preparation of Standard

A stock standard mixture was prepared by injecting a known amount (200 - 400 ul) of each target compound into a 10 ml reactiflask fitted with a Mininert valve. Throughout the study a new stock standard was prepared a minimum of every 6 months, but normally every 4 months. To produce gaseous standards, aliquots of the resulting solution were injected into a nitrogen filled bottle equipped with a septum cap. The standard bottle was heated to 40°C after which a 10 ml injection of this gaseous standard was introduced into the concentrator through an empty tube held at 60°C in the desorbition unit. To fortify a sorbent tube a 1 ul aliquot of diluted stock standard was introduced onto the glass bead layer of the tube held at room temperature in the desorbition unit.

2.5 Sample Collection

The sorbent tube samples were collected at **three preselected**
Site which will be referred to as:

Site #1 - West

Site #2 - Central

Site #3 - East

At each site two parallel samples were drawn using a source sampler constructed by Mann Testing. The source samplers were constructed of polypropylene and bolted together to avoid any

contamination from glue or the material itself. The samplers were mounted approximately 4 feet above the ground on a pipe. The flow through the tubes, (measured on site) varied from sampling to sampling and were 400-600 ml/min and 150-300 ml/min for the high and low volume samples respectively. The resulting volumes collected from a two hour sampling were 40-60 litres and 15-30 litres.

After sample collection the sorbent tubes were sealed in individual screw cap glass tubes and stored in a tightly sealed container at 4°C in the dark until analysis.

The bag samples were collected from the bore hole test vent and the circulating vent probes determined on the day of sampling. All of the samples were obtained by plugging the vents and allowing the eluting gas to fill the bag passively.

Weather conditions during sampling was also noted and presented in Appendix C, Table 16.

2.6 Analysis

The ATD/GC/MS sample analysis was carried out within 0 - 5 days of sampling. The bag samples were analyzed the same day or the following day to eliminate concentration change. The bag samples were heated slightly to 35°C prior to injection in order to minimize the loss of compounds due to sticking to the inner wall. Target compounds were identified by retention times and by full mass spectra, or by the presence of appropriate fragment

ions. Quantitation was achieved by comparison of peak height from reconstructed ion chromatograms of the two or three most intense ions for each compound with corresponding peaks from a standard mixture.

3.0 RESULTS AND DISCUSSION

A total of twenty-three volatile organic compounds (VOC's) were selected for study in this 3-year project concerning the Upper Ottawa Landfill Site. During the period of October 1985 to April 1988, 28 sets of samples were collected and analyzed for VOC's. The time between samplings was approximately one month. However, if some problem occurred with the collection and/or the analysis of the samples, the sample set would be discarded and the samples re-collected again.

The data obtained from the sorbent tubes is included in Appendix A, Tables 1,2 and 3 along with [REDACTED]

[REDACTED] Upon examination of the graphs, it can be seen that the most consistent site was #2 (Central), except for November '87 when all of the sites yielded higher concentrations. Site #1 was relatively stable except for a high toluene concentration in May '86. The most unpredictable site was #3, with concentrations fluctuating from time to time. Upon comparing site #3's graph with the others, there seems to be no correlation between the concentration of different compounds. (ie. When toluene is high, it does not follow that xylene will be high.)

The testwell, bore hole and vent probe results are included in Tables 4 - 14 contained in Appendix B. For ease of interpretation, the data has been organized in terms of probe number rather than sampling date. It was observed that when a

heavy rain had preceeded the day of sampling, the flows from the vent probes were perceptively decreased. The included graphs of the concentrations of toluene and xylene in the testwell and vent probe #3 short show a definite overall decline in concentration over the period of the study. [REDACTED]

[REDACTED] although the fastest flowing, [REDACTED]

[REDACTED] It did make a bubbling sound indicating that the gas was travelling through a water block, which could account for the low values.

The weather conditions on the day of sampling have been tabulated and can be found in Appendix C. Also in Appendix C is the map of the landfill, relating to the gas vents, and the Method Detection Limits (MDL). Appendix D contains copies of all reports previously submitted.

Instrument and sampling problems resulted in the loss of both the sample sorbent tube and the backup from the 4th sampling of site #3. It was therefore agreed on by Mr. Gerry Dykeman that Mann Testing would take an extra set of samples upon completion of the project. This set of samples was reported as the 28th of 27.

Problems can be encountered with the ATD/GC/MS technique if the concentration of organics in the sample is too large since the mass spectrometer can be saturated with respect to certain ions. This prevents accurate quantitation unless alternative ions, specific to the compound of interest, can be utilized.

However, the use of less intense ions is likely to lead to poorer precision and to significant increase in the time required for data analysis. For these reasons, each site had two parallel samples collected, a low and a high volume sample. In most cases the high volume sample was used for quantitation. The low volume sample was used only when the quantitation ion of a particular compound was saturated. Additionally the low volume samples were kept as a backup and as a check for any unusual result.

PER STAFF - AMPL 175

WMIP 1985/1986

Slope stabilization \$ 14,747.50
Gas Monitoring \$ 24,712.00
\$ 39,459.50

WMIP 1986/1987

Slope stabilization \$ 20,000.00
Gas Monitoring \$ 20,000.00
Leachate flow meter \$ 14,000.00
\$ 54,000.00

Report for WMIP 1987/1988

Gas monitoring - 1000 hours
Leachate flow meter - 1000 hours

Leachate flow meter - 1000 hours
Gas monitoring - 1000 hours

Leachate flow meter - 1000 hours
Gas monitoring - 1000 hours

Leachate flow meter - 1000 hours
Gas monitoring - 1000 hours

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Gas monitoring - 1000 hours

Leachate flow meter - 1000 hours
Gas monitoring - 1000 hours

Leachate flow meter - 1000 hours
Gas monitoring - 1000 hours

Report for WMIP 1987/1988

Gas monitoring - 1000 hours
Leachate flow meter - 1000 hours
Leachate flow meter - 1000 hours
Leachate flow meter - 1000 hours

Maximum budget \$ 100,000.00

Gerry

This is the cheque that Tracey Howe received from
the M.O.E.

lets keep it in our WMIP file.

Thank you

Val

PROVINCE OF ONTARIO

GENERAL ACCOUNTS

2264961 RH

000090259200

DATE APR 10, 1987



Ontario

TREASURER

Reverend

M. B. ...

PAY EXACTLY *****52,895 DOLLARS AND 07 CENTS
TO THE ORDER OF
HAMILTON-WENTWORTH, THE REGIONAL
MUNICIPALITY OF

\$52,895.07

P.O. BOX 910
119 KING ST. WEST
HAMILTON, ONT.

032196
37 000613

LSN 3V9

The Royal Bank of Canada
Royal Bank Plaza
Toronto, Ontario

00002 003

4408 AUDIT #2264961

⑈ 2264961 ⑈ ⑆00002⑆003⑆ 000⑈440⑈8⑈



Ontario

MINISTRY OF THE ENVIRONMENT

4408 APR 10, 87

TELEPHONE 416-

REQUISITION NO. 000613

INVOICE NO	DATE	AMOUNT	INVOICE NO	DATE	AMOUNT
A5301C1	032487	\$52895.07			
TOTAL					\$52895.07
WASTE MANAGEMENT IMPROVEMENT					

REMITTANCE ADVICE

$$70000 - 9073 = 80927$$

= 27 monitoring dates
MPF
funding

equipment \$ 9073

30 Oct/85
27 Nov
14 Jan/86
5 Feb
26 Feb
19 Mar
30 Apr
28 May
18 June
23 July
27 Aug
24 Sept
5 Nov
4 Dec
14 Jan/87
Feb
Mar

7 x 2235.- 15645 \$ 24718 25000.-

6 x 2235.- 13410

5 x 2235.- 11175.- 24585 20000

2
~~1~~ x 2235 0705 - ~~20115~~ - 20115 25000
\$ 69418.- \$ 70000



THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

Department of Engineering
71 Main Street West, Hamilton, Ont. L8N 3T4 (416) 526-4170

PINK

March 27, 1986

Refer to File No

Attention of V. Terluk

Your File No

Ministry of the Environment
119 King Street West
P.O. Box 2112
Hamilton, Ontario
L8N 3V9

Attention: J. Vogt, District Officer

Ministry Project Funding Program

Gentlemen:

We are submitting for your consideration an addendum to the two claims recently submitted to you, for Regional projects which your Ministry is funding (see attached).

One of the claims which we made under your Waste Management Improvement Program 1985/1986, totalled \$20,276.66. This total exceeds the agreed maximum commitment of \$19,500 by \$776 or 4%.

Our second claim for \$39,465.82 made under your Waste Management Improvement Program FY 1985, 1986, is approximately \$9,500 less than the \$49,000 total that was available to us.

If it is possible for your Ministry to accommodate our requests, we ask that adjustments be made to (a) cover the extra \$776.00 in our \$20,276.66 claim, and (b) permit the transfer of the \$9500 unspent amount from Phase I, into phase 2 of our program which falls into your 1986-87 Fiscal year.

It should be noted that the aforementioned \$9500. was not spent because the former Upper Ottawa Landfill Slope Vegetation Program for which the funds were allocated, was delayed by seasonal planting restrictions, and by a delay in the finalization of a site planting strategy.

We would be pleased to provide you additional data, or discuss our requests in more detail. If necessary, contact V. Terluk of our Solid Waste Management Division at 526-4417.

G.S.-Spencer, Director
Environmental Services

VT:mc
Attach.

March 27, 1986

E309-C1A
R.F. Palombelli

Ministry of the Environment
119 King Street West
P.O. Box 2112
Hamilton, Ontario
L8N 3V9

Attention: J. Vogt, District Officer

Waste Management Improvement Program FY 1985/1986

Gentlemen:

As requested, we are forwarding copies of proof of payment for the following projects:

1) First of a two year Slope Vegetation Program at the Upper Ottawa Street Landfill Site	\$14,747.82
2) First of a three year Gas Monitoring Program at the Upper Ottawa Street Landfill Site	<u>\$24,718.00</u>
Total	\$39,465.82

Your re-imbusement for these projects for the first year of the Waste Management Improvement Program FY 1985/1986 will be greatly appreciated.

Copies of invoices for work performed during the second and third year of the program will be forwarded by March 1987 and 1988.

G.S. Spencer, Director
Environmental Services

GD:mc
Attach.

March 27, 1986

E308-02
R.F. Palombel

Ministry of the Environment
119 King Street West
P.O. Box 2112
Hamilton, Ontario
L8N 3V9

Attention: J. Vogt; District Officer

Waste Management Improvement Program 1985/1986

Gentlemen:

As requested, we are forwarding copies of proof of payment for the following projects:

1) Seeding and mulching of side slopes at the Regional Landfill Site	\$2,500.00
2) Grading and Seeding at the Brampton Landfill Site	\$4,999.66
3) Installation of French Drains at the Upper Ottawa Street Landfill Site	<u>\$12,777.00</u>
Total	\$20,276.66

Your reimbursement for these projects under the Waste Management Improvement Program 1985/1986 will be greatly appreciated.

G.S. Spencer, Director
Environmental Services

GD:mc
Attach.

ID # 0024D (42)

April 14, 1986

E308-22

E308-02

V. Terluk

Ministry of the Environment
119 King Street West
P.O. Box 2112
Hamilton, Ontario
L8N 3V9

Att: H. Campbell,
Senior Environmental Officer

Waste Management Improvement
Program FY 1986-7

Gentlemen:

In July 1985, Regional Council endorsed a resolution authorizing the Region to execute a contract agreement to fund a Slope Stability, and Landfill Gas Sampling Project at the former Upper Ottawa Street Landfill Site, for which your Ministry is providing a total subsidy of \$120,000. (The attached correspondence dated May 22, 1985 provides program funding details)

The three year project was scheduled in a manner that requires the Region to enter into a separate agreement with the Ministry in each of the three years of the project.

In the first fiscal year (1985-6) the amount of money requested by the Region was \$49,000. This requested allocation was made on the basis that the field work would be initiated in the early spring. However, due to unavoidable delays in the approval of the slope stability portion of the project, the field work was not started until late in the planting season. This delay caused a reduction in the first phase of work resulting in a first fiscal year billing \$9,534.18 lower than originally projected.

The contract agreement between the Region and the planting contractor was finalized on the basis that the total contract cost would be \$50,000 (\$24,000 in 1985-6, and \$26,000 in 1986-7). We request that the Ministry permit us to transfer the unspent portion (\$9,534.18) of the 1985-6 fiscal year allocation into the 1986-7 fiscal year, so that we will be able to complete the project as proposed. With your approval, this measure will provide a second fiscal year allocation of \$55,534.18.

Cont'd ...

- page 2 -
April 14, 1986

Cont'd ...

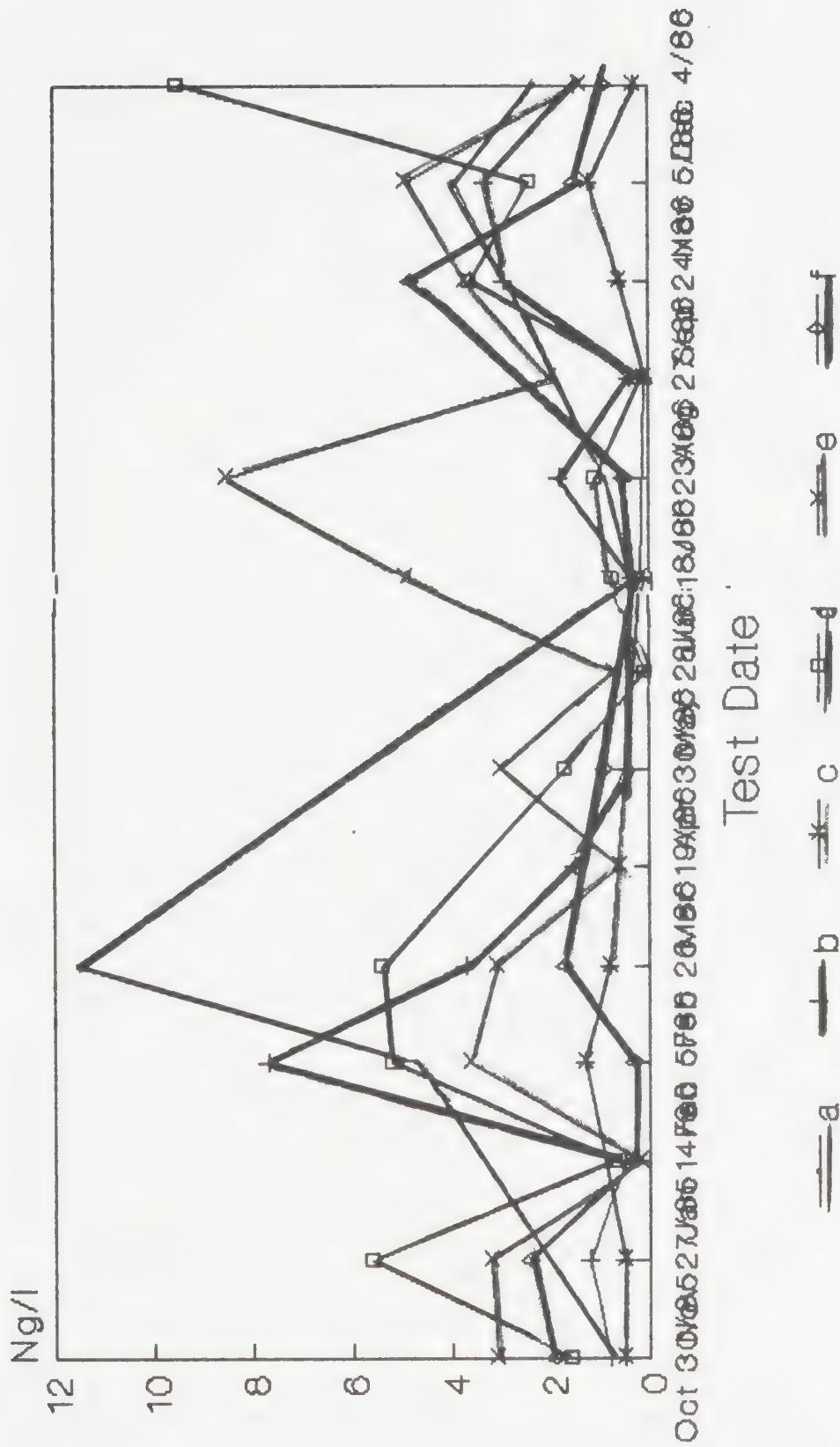
Should you require additional information, or wish to discuss our request in more detail, contact Mr. V. Terluk, of the Region's Solid Waste Management Division at 526-4417. Your consideration and early reply in this matter will be greatly appreciated.

G. S. Spencer, Director
Environmental Services

VS:lj
Attach.

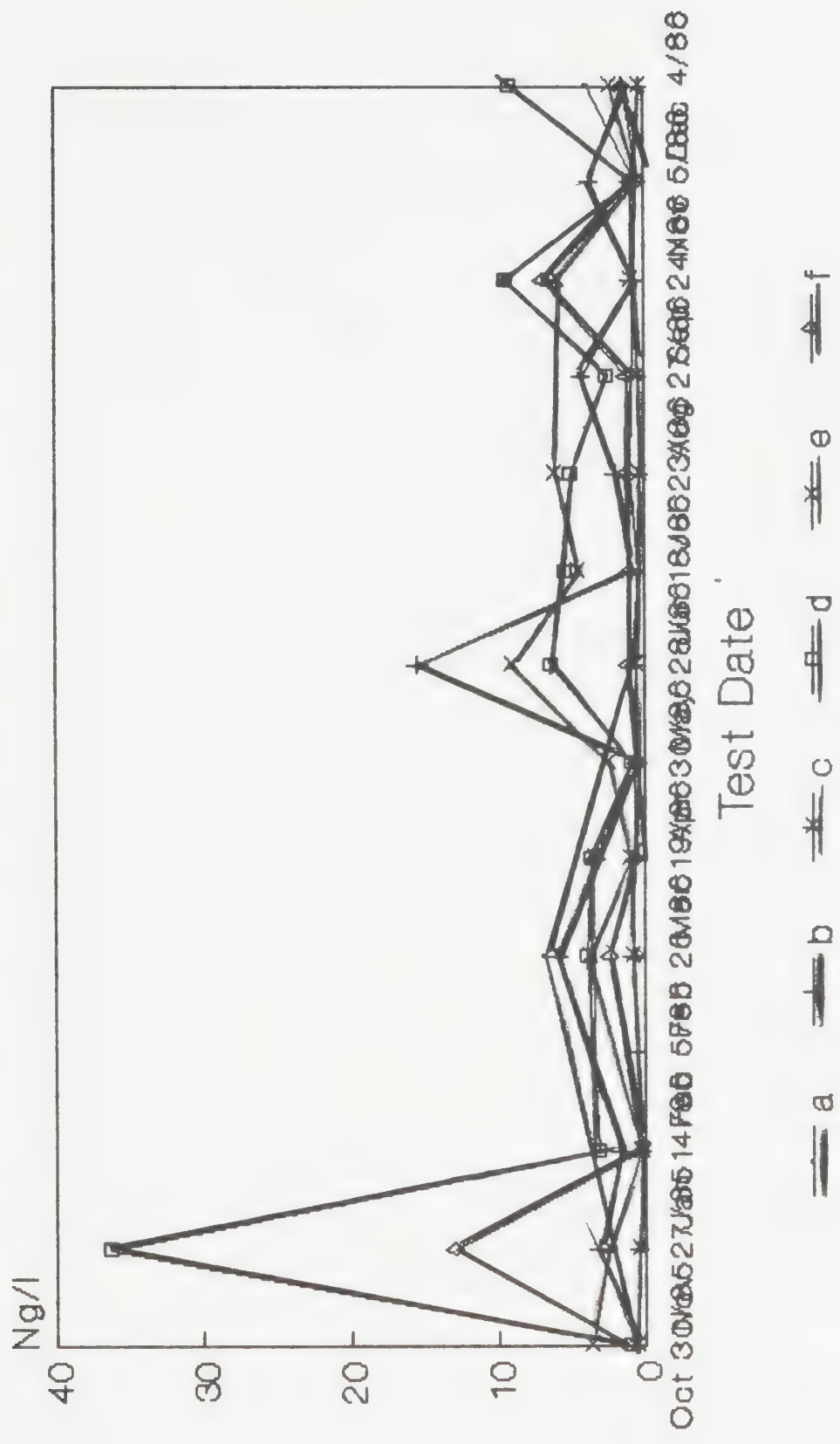
Upper Ottawa St. Landfill

Ambient Air 2 Test Oct/85-Dec/86



Upper Ottawa St. Landfill

Ambient Air 3 Test Oct/85-Dec/86



Upper Ottawa St. Landfill Test Well Oct/85-Dec/86

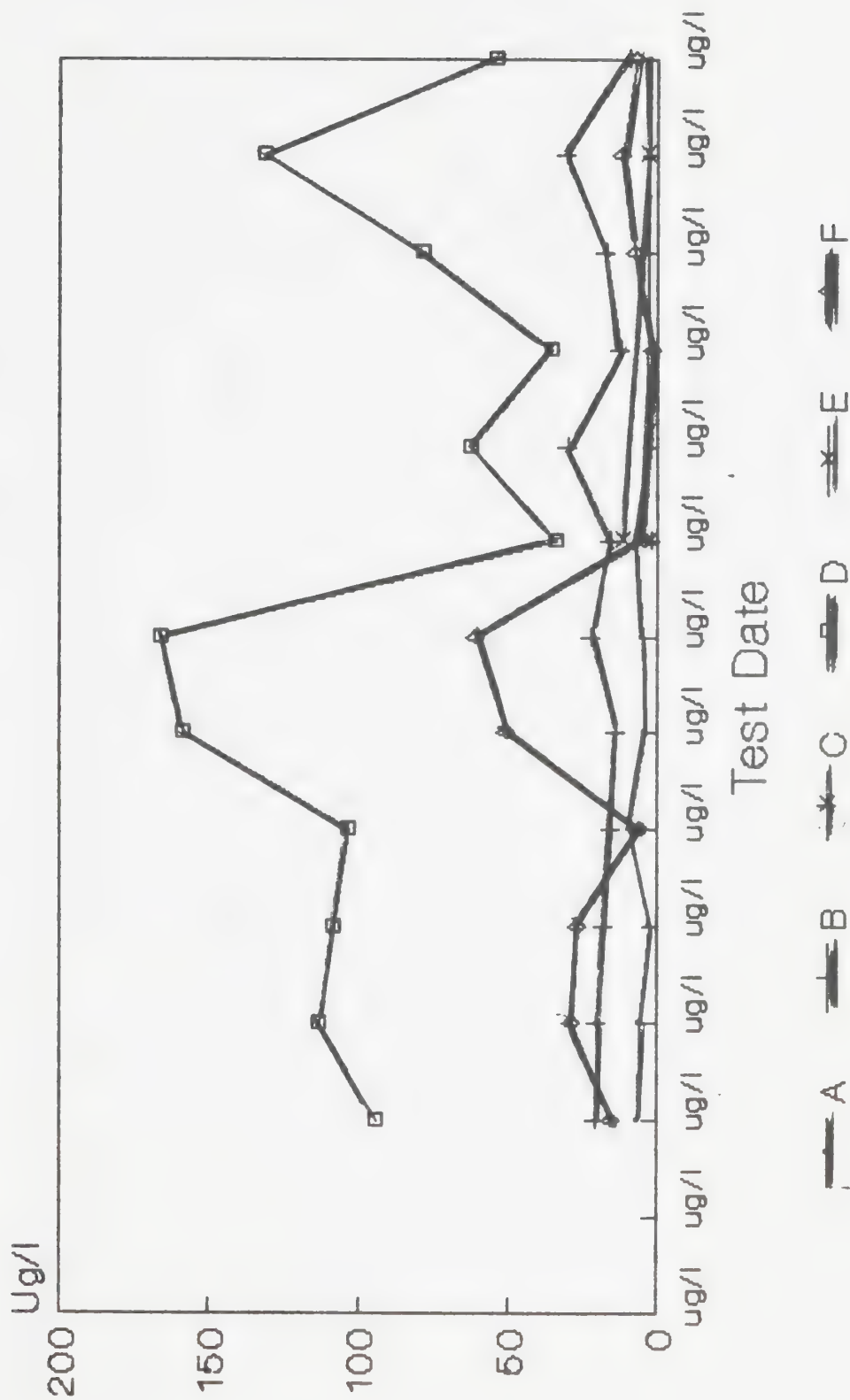


Table 1
SITE #1

COMPOUND	SAMPLING DATE							
	#1	#2	#3	#4	#5	#6	#7	#8
	OCT 30/85 ng/L	NOV 27/85 ng/L	JAN 14/86 ng/L	FEB 05/86 ng/L	FEB 26/86 ng/L	MAR 19/86 ng/L	APR 30/86 ng/L	MAY 28/86 ng/L
1,1-Dichloroethene	0.6	ND	ND	2.8	0.7	1.2	ND	BMDL
1,2-Dichloroethene (trans)	ND	0.3	ND	ND	ND	ND	ND	BMDL
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	BMDL	0.4	ND	1.1	ND	ND	BMDL	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	1.1	2.5	0.5	6.4	3.9	0.6	BMDL	0.5
Benzene	1.0	3.3	2.0	12.1	3.8	4.4	0.8	BMDL
Trichloroethene	BMDL	ND	0.3	1.1	0.7	0.6	ND	BMDL
1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	BMDL
[REDACTED]	2.4	4.6	1.7	12.9	4.7	1.9	1.4	48.8
Tetrachloroethene	0.4	0.7	0.1	1.2	0.5	0.2	BMDL	0.3
Ethylbenzene	1.3	1.6	0.2	2.3	2.8	0.1	1.1	0.1
[REDACTED]	8.8	6.8	1.3	7.3	7.3	0.6	2.2	1.7
[REDACTED]	1.3	1.6	0.6	4.2	1.9	0.3	0.7	0.8
Benzaldehyde	4.3	1.8	0.6	4.7	3.2	1.5	1.7	4.4
1,2,4-Trimethylbenzene	2.6	2.0	0.2	1.5	2.3	0.2	0.6	0.3
Phenol	ND	ND	ND	ND	1.5	BMDL	3.0	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	BMDL	ND	ND
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.4	BMDL	BMDL	BMDL	BMDL
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	0.7	2.3	0.1	2.5	BMDL	BMDL	BMDL	0.2

ND - None Detected
BMDL - Below Method Detection Limit

Table 1
SITE #1

COMPOUND	SAMPLING DATE							
	#9	#10	#11	#12	#13	#14	#15	#16
	JUN 18/86	JUL 23/86	AUG 27/86	SEP 24/86	NOV 05/86	DEC 04/86	JAN 14/87	FEB 18/87
	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	ND	BMDL	ND	ND	0.7	ND	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	0.8	0.2	ND	0.3	11.3
1,1-Dichloroethane	ND	ND	1.2	BMDL	0.2	ND	ND	ND
1,2-Dichloroethene (cis)	BMDL	ND	2.0	ND	BMDL	1.7	ND	ND
Chloroform	BMDL	BMDL	ND	ND	0.3	ND	ND	ND
Tetrahydrofuran	ND	BMDL	ND	ND	ND	BMDL	ND	ND
1,1,1-Trichloroethane	ND	1.1	5.5	ND	2.8	1.7	0.4	ND
Benzene	0.9	2.3	3.7	0.2	3.0	1.1	ND	6.1
Trichloroethene	BMDL	BMDL	BMDL	ND	0.6	ND	ND	0.8
1,4-Dioxane	ND	ND	ND	ND	BMDL	ND	ND	ND
[REDACTED]	4.0	4.0	6.7	7.7	4.1	1.6	0.7	5.0
Tetrachloroethene	0.2	0.3	0.4	1.0	0.9	0.3	ND	2.6
Ethylbenzene	1.1	1.0	1.7	2.0	1.0	2.2	0.1	3.2
[REDACTED]	2.7	4.8	3.9	4.1	4.6	0.6	BMDL	4.1
[REDACTED]	1.0	1.1	1.7	2.7	1.0	0.3	0.1	10.8
Benzaldehyde	4.2	6.7	5.4	3.7	2.5	BMDL	0.6	13.7
1,2,4-Trimethylbenzene	0.5	1.1	0.8	7.6	0.9	1.5	BMDL	7.8
Phenol	ND	ND	ND	ND	1.8	ND	ND	3.8
1,3-Dichlorobenzene	ND	BMDL	BMDL	BMDL	BMDL	ND	ND	ND
1,4-Dichlorobenzene	BMDL	ND	ND	0.3	BMDL	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	BMDL	BMDL	BMDL	ND	ND	ND
Naphthalene	BMDL	1.1	BMDL	0.7	BMDL	BMDL	BMDL	0.6

ND - None Detected
BMDL - Below Method Detection Limit

Table 1
SITE #1

COMPOUND	SAMPLING DATE							
	#17	#18	#19	#20	#21	#22	#23	#24
	MAR 18/87	APR 30/87	MAY 21/87	JUN 24/87	JUL 23/87	AUG 20/87	SEP 24/87	NOV 26/87
	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	ND	ND	5.8	3.9	1.5	1.2	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	ND	ND	1.2
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND	3.2
Chloroform	ND	ND	1.7	ND	0.5	0.2	ND	0.9
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5.6	2.0	0.6	3.2	4.3	1.5	ND	9.5
Benzene	1.8	0.3	1.8	4.1	2.6	1.0	0.7	8.6
Trichloroethene	ND	ND	BMDL	BMDL	0.3	ND	ND	2.4
1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	ND
[REDACTED]	6.6	0.3	5.2	4.9	3.8	1.5	4.1	46.5
Tetrachloroethene	0.3	ND	1.2	0.4	1.5	BMDL	0.7	10.5
Ethylbenzene	1.6	0.1	1.0	0.7	0.6	0.3	0.5	10.8
[REDACTED]	4.9	0.2	2.5	1.8	2.0	0.9	3.4	27.0
[REDACTED]	1.8	0.1	1.1	0.6	0.7	0.5	1.0	3.5
Benzaldehyde	5.6	1.5	1.9	4.8	ND	6.0	1.7	ND
1,2,4-Trimethylbenzene	1.2	0.2	1.3	0.6	0.5	0.6	1.0	9.3
Phenol	ND	ND	ND	-	-	-	-	-
1,3-Dichlorobenzene	ND	ND	ND	0.3	BMDL	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	BMDL	ND	ND	ND	ND	0.9
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	BMDL	BMDL	0.6	BMDL	BMDL	2.6	21.7

ND - None Detected
BMDL - Below Method Detection Limit

Table 1
SITE #1

COMPOUND	SAMPLING DATE			
	#25	#26	#27	#28
	JAN 27/88	FEB 23/88	MAR 17/88	APR 27/88
	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	3.4	ND	ND	4.6
1,2-Dichloroethene (trans)	ND	ND	ND	1.3
1,1-Dichloroethane	ND	ND	ND	7.2
1,2-Dichloroethene (cis)	ND	ND	ND	7.1
Chloroform	4.1	ND	ND	20.9
Tetrahydrofuran	ND	0.3	ND	ND
1,1,1-Trichloroethane	1.4	ND	ND	1.0
Benzene	7.6	0.7	0.5	20.4
Trichloroethene	ND	ND	ND	2.4
1,4-Dioxane	ND	ND	ND	ND
Toluene	3.9	0.9	0.8	4.1
Tetrachloroethene	0.4	ND	ND	0.8
Ethylbenzene	0.6	0.2	0.2	1.0
m & p-Xylene	1.6	0.5	0.4	2.4
o-Xylene	0.7	0.3	0.2	2.0
Benzaldehyde	1.5	1.8	4.1	ND
1,2,4-Trimethylbenzene	0.9	0.3	0.2	2.3
Phenol	ND	ND	-	-
1,3-Dichlorobenzene	ND	ND	ND	0.6
1,4-Dichlorobenzene	ND	ND	ND	1.1
1,2-Dichlorobenzene	ND	ND	ND	0.4
Naphthalene	BMDL	BMDL	BMDL	BMDL

ND - None Detected
BMDL - Below Method Detection Limit

Table 2
SITE #2

COMPOUND	SAMPLING DATE							
	#1	#2	#3	#4	#5	#6	#7	#8
	OCT 30/85 ng/L	NOV 27/85 ng/L	JAN 14/86 ng/L	FEB 05/86 ng/L	FEB 26/86 ng/L	MAR 19/86 ng/L	APR 30/86 ng/L	MAY 28/86 ng/L
1,1-Dichloroethene	0.3	BMDL	ND	2.1	1.9	ND	ND	BMDL
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.1	ND	ND	ND
Chloroform	BMDL	0.2	ND	0.3	0.2	ND	BMDL	BMDL
Tetrahydrofuran	ND	ND	ND	1.4	ND	ND	ND	ND
1,1,1-Trichloroethane	0.7	ND	ND	4.7	11.5	ND	BMDL	BMDL
Benzene	0.8	1.2	0.5	7.7	3.7	1.5	0.5	BMDL
Trichloroethene	BMDL	ND	0.1	0.4	1.2	BMDL	ND	BMDL
1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	BMDL
Toluene	3.1	3.1	1.5	1.3	10.6	0.3	1.5	2.3
Tetrachloroethene	0.5	0.5	BMDL	1.3	0.8	BMDL	BMDL	BMDL
Ethylbenzene	1.6	5.6	0.7	5.2	5.4	BMDL	1.7	0.1
m & p-Xylene	6.5	14.0	2.6	11.0	11.7	0.2	4.0	0.1
o-Xylene	1.3	2.6	1.3	3.3	2.6	BMDL	1.4	0.1
Benzaldehyde	3.1	3.2	0.2	3.6	3.1	0.6	3.0	0.7
1,2,4-Trimethylbenzene	1.9	2.4	0.3	0.3	1.7	BMDL	0.9	BMDL
Phenol	ND	ND	ND	ND	1.2	BMDL	2.8	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	BMDL	ND	BMDL
1,4-Dichlorobenzene	BMDL	ND	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	0.5	2.5	0.1	19.7	BMDL	BMDL	BMDL	BMDL

ND - None Detected

BMDL - Below Method Detection Limit

Table 2
SITE #2

COMPOUND	SAMPLING DATE							
	#9	#10	#11	#12	#13	#14	#15	#16
	JUN 18/86 ng/L	JUL 23/86 ng/L	AUG 27/86 ng/L	SEP 24/86 ng/L	NOV 05/86 ng/L	DEC 04/86 ng/L	JAN 14/87 ng/L	FEB 18/87 ng/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	BMDL	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	3.8	1.4	ND
1,1-Dichloroethane	ND	ND	BMDL	ND	0.3	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	BMDL	ND	ND	9.5
Chloroform	ND	BMDL	ND	BMDL	0.4	0.8	0.5	12.4
Tetrahydrofuran	ND	ND	ND	0.3	ND	ND	ND	ND
1,1,1-Trichloroethane	0.4	0.9	ND	ND	3.9	2.3	0.4	41.9
Benzene	0.4	1.8	0.4	2.9	3.3	1.5	4.1	7.5
Trichloroethene	BMDL	BMDL	ND	ND	0.4	ND	ND	0.7
1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1.3	2.7	BMDL	3.9	5.4	2.1	1.2	5.6
Tetrachloroethene	0.2	BMDL	0.1	0.6	1.2	0.3	ND	2.5
Ethylbenzene	0.8	1.1	0.2	3.6	2.4	9.5	0.4	1.4
m & p-Xylene	1.4	3.3	0.2	7.4	6.4	2.5	0.4	5.0
o-Xylene	0.3	1.0	0.2	4.7	1.3	0.7	0.3	4.7
Benzaldehyde	4.9	8.5	2.0	3.7	4.9	1.4	BMDL	17.4
1,2,4-Trimethylbenzene	0.3	0.5	BMDL	4.8	1.5	0.9	BMDL	8.5
Phenol	ND	ND	ND	ND	1.6	BMDL	ND	5.3
1,3-Dichlorobenzene	ND	ND	ND	BMDL	BMDL	ND	ND	ND
1,4-Dichlorobenzene	BMDL	ND	ND	0.5	BMDL	BMDL	ND	0.8
1,2-Dichlorobenzene	ND	ND	ND	BMDL	BMDL	ND	ND	ND
Naphthalene	BMDL	0.8	BMDL	0.7	BMDL	BMDL	BMDL	7.3

ND - None Detected
BMDL - Below Method Detection Limit

Table 2
SITE #2

COMPOUND	SAMPLING DATE							
	#17	#18	#19	#20	#21	#22	#23	#24
	MAR 18/87	APR 30/87	MAY 21/87	JUN 24/87	JUL 23/87	AUG 20/87	SEP 24/87	NOV 26/87
	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	ND	0.6	ND	2.6	ND	3.4	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	ND	ND	0.5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND	1.4
Chloroform	ND	ND	ND	ND	ND	0.2	ND	1.0
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	2.2	8.8	ND	2.0	7.8	1.6	ND	3.1
Benzene	1.2	1.2	0.7	3.7	3.4	1.7	0.6	8.7
Trichloroethene	ND	ND	BMDL	BMDL	0.4	ND	ND	2.3
1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1.2	1.3	2.0	4.7	3.9	1.6	4.4	53.5
Tetrachloroethene	ND	0.2	0.5	0.2	1.6	BMDL	0.8	9.6
Ethylbenzene	0.7	0.2	0.7	1.2	3.2	0.4	1.4	12.0
m & p-Xylene	2.6	0.6	1.5	3.2	17.7	1.1	4.3	29.6
o-Xylene	0.7	0.3	0.5	0.9	0.2	0.4	1.3	7.5
Benzaldehyde	4.9	6.6	3.6	4.7	ND	2.8	1.5	ND
1,2,4-Trimethylbenzene	0.5	0.6	0.6	0.8	1.4	0.3	0.7	13.2
Phenol	ND	ND	ND	-	-	-	-	-
1,3-Dichlorobenzene	ND	ND	ND	0.6	0.3	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	BMDL	ND	ND	ND	ND	1.3
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	BMDL	BMDL	BMDL	0.6	BMDL	BMDL	1.7	18.6

ND - None Detected
BMDL - Below Method Detection Limit

Table 2
SITE #2

SAMPLING DATE

COMPOUND	#25	#26	#27	#28
	JAN 27/88	FEB 23/88	MAR 17/88	APR 27/88
	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	ND	ND	ND	4.4
1,2-Dichloroethene (trans)	ND	ND	ND	0.5
1,1-Dichloroethane	ND	ND	ND	3.3
1,2-Dichloroethene (cis)	ND	ND	ND	1.2
Chloroform	ND	ND	ND	9.6
Tetrahydrofuran	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	0.9
Benzene	0.2	0.1	0.8	28.2
Trichloroethene	ND	ND	ND	1.5
1,4-Dioxane	ND	ND	ND	ND
Toluene	ND	0.3	1.1	3.9
Tetrachloroethene	ND	ND	ND	0.7
Ethylbenzene	ND	ND	0.5	1.5
m & p-Xylene	ND	0.1	1.2	3.4
o-Xylene	ND	ND	0.3	1.6
Benzaldehyde	1.8	0.5	6.4	ND
1,2,4-Trimethylbenzene	ND	ND	0.3	1.4
Phenol	ND	ND	-	-
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	BMDL
1,2-Dichlorobenzene	ND	ND	ND	BMDL
Naphthalene	ND	ND	BMDL	BMDL

ND - None Detected
BMDL - Below Method Detection Limit

Table 3
SITE #3

COMPOUND	SAMPLING DATE							
	#1	#2	#3	#4	#5	#6	#7	#8
	OCT 30/85 ng/L	NOV 27/85 ng/L	JAN 14/86 ng/L	FEB 05/86 ng/L	FEB 26/86 ng/L	MAR 19/86 ng/L	APR 30/86 ng/L	MAY 28/86 ng/L
1,1-Dichloroethene	0.3	BMDL	ND	NA	1.3	1.5	ND	BMDL
1,2-Dichloroethene (trans)	ND	BMDL	ND	NA	ND	ND	BMDL	ND
1,1-Dichloroethane	ND	1.5	ND	NA	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	0.8	ND	NA	ND	ND	ND	ND
Chloroform	BMDL	BMDL	ND	NA	0.4	ND	BMDL	0.2
Tetrahydrofuran	ND	3.0	ND	NA	ND	ND	ND	ND
1,1,1-Trichloroethane	0.7	ND	ND	NA	6.8	ND	BMDL	0.9
Benzene	0.7	3.2	1.7	NA	5.8	3.3	0.5	15.5
Trichloroethene	BMDL	BMDL	ND	NA	1.3	0.3	ND	BMDL
1,4-Dioxane	ND	ND	ND	NA	ND	ND	ND	BMDL
Toluene	1.9	36.2	13.5	NA	9.6	11.2	1.2	178.7
Tetrachloroethene	0.5	0.4	0.2	NA	0.8	BMDL	BMDL	0.6
Ethylbenzene	1.0	36.3	3.2	NA	3.9	3.6	0.9	6.4
m & p-Xylene	3.8	81.2	10.6	NA	9.1	10.8	2.1	11.0
o-Xylene	0.7	34.7	2.3	NA	2.9	3.1	0.7	5.4
Benzaldehyde	3.6	2.5	0.3	NA	3.7	1.0	2.5	9.0
1,2,4-Trimethylbenzene	1.2	12.9	0.3	NA	2.4	0.6	0.4	1.1
Phenol	ND	ND	ND	NA	1.6	BMDL	1.6	ND
1,3-Dichlorobenzene	ND	ND	ND	NA	ND	BMDL	ND	ND
1,4-Dichlorobenzene	BMDL	ND	BMDL	NA	BMDL	BMDL	BMDL	0.5
1,2-Dichlorobenzene	ND	ND	ND	NA	ND	ND	ND	BMDL
Naphthalene	BMDL	3.9	ND	NA	1.3	BMDL	BMDL	BMDL

ND - None Detected

BMDL - Below Method Detection Limit

Table 3
SITE #3

COMPOUND	SAMPLING DATE							
	#9	#10	#11	#12	#13	#14	#15	#16
	JUN 18/86 ng/L	JUL 23/86 ng/L	AUG 27/86 ng/L	SEP 24/86 ng/L	NOV 05/86 ng/L	DEC 04/86 ng/L	JAN 14/87 ng/L	FEB 18/87 ng/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	0.8	ND	ND
1,2-Dichloroethene (trans)	ND	BMDL	ND	ND	ND	ND	1.5	8.6
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (cis)	BMDL	ND	0.4	ND	1.2	ND	ND	ND
Chloroform	0.2	0.9	ND	BMDL	0.3	ND	0.4	ND
Tetrahydrofuran	0.3	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.4	1.0	ND	BMDL	0.6	3.8	0.5	39.6
Benzene	0.9	2.0	4.2	0.7	3.6	1.5	5.7	6.2
Trichloroethene	ND	BMDL	0.8	BMDL	ND	ND	ND	0.8
1,4-Dioxane	BMDL	ND	ND	ND	ND	ND	ND	ND
Toluene	9.2	7.6	7.2	8.9	1.7	4.8	2.6	40.4
Tetrachloroethene	BMDL	0.3	0.4	0.9	0.9	0.3	ND	1.3
Ethylbenzene	5.4	5.0	2.6	9.4	0.9	9.1	0.8	3.5
m & p-Xylene	14.5	19.2	5.3	29.7	1.5	8.0	1.5	3.7
o-Xylene	4.3	5.0	2.2	12.5	0.6	0.3	0.7	3.5
Benzaldehyde	4.5	6.1	BMDL	5.9	0.4	2.3	BMDL	14.1
1,2,4-Trimethylbenzene	1.0	1.3	1.2	6.9	0.4	1.4	BMDL	4.9
Phenol	ND	ND	BMDL	ND	ND	BMDL	ND	3.4
1,3-Dichlorobenzene	ND	BMDL	BMDL	BMDL	ND	ND	ND	ND
1,4-Dichlorobenzene	BMDL	BMDL	ND	0.7	ND	BMDL	ND	0.4
1,2-Dichlorobenzene	ND	ND	ND	BMDL	ND	ND	ND	ND
Naphthalene	BMDL	0.6	BMDL	0.6	BMDL	BMDL	BMDL	8.8

ND - None Detected
BMDL - Below Method Detection Limit

Table 3
SITE #3

COMPOUND	SAMPLING DATE							
	#17	#18	#19	#20	#21	#22	#23	#24
	MAR 18/87	APR 30/87	MAY 21/87	JUN 24/87	JUL 23/87	AUG 20/87	SEP 24/87	NOV 26/87
	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	0.6	0.4	5.4	1.7	0.9	1.1	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND	1.3
Chloroform	ND	5.5	2.5	ND	ND	0.2	ND	7.1
Tetrahydrofuran	ND	ND	ND	1.9	ND	0.6	ND	ND
1,1,1-Trichloroethane	4.0	5.0	0.8	3.0	5.7	1.4	ND	12.0
Benzene	2.5	1.3	1.4	2.9	9.4	1.1	1.3	10.5
Trichloroethene	ND	ND	BMDL	BMDL	0.3	ND	ND	3.1
1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	2.9	1.7	4.1	6.5	5.5	3.2	8.4	60.5
Tetrachloroethene	ND	BMDL	0.5	0.2	1.1	BMDL	1.5	11.1
Ethylbenzene	5.4	1.7	1.1	3.9	3.4	3.1	3.3	16.4
m & p-Xylene	7.7	4.4	2.0	9.3	18.8	10.8	9.9	26.1
o-Xylene	2.3	1.2	0.7	4.5	10.5	4.2	2.3	11.0
Benzaldehyde	6.1	3.8	1.0	2.6	1.2	4.2	2.7	ND
1,2,4-Trimethylbenzene	1.1	1.4	0.9	1.3	3.7	1.1	1.7	18.7
Phenol	ND	ND	ND	-	-	-	-	-
1,3-Dichlorobenzene	ND	ND	ND	0.3	0.3	ND	ND	ND
1,4-Dichlorobenzene	ND	BMDL	BMDL	ND	ND	ND	0.3	2.1
1,2-Dichlorobenzene	ND	ND	0.3	ND	ND	ND	ND	ND
Naphthalene	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	2.5	19.3

ND - None Detected

BMDL - Below Method Detection Limit

Table 3
SITE #3

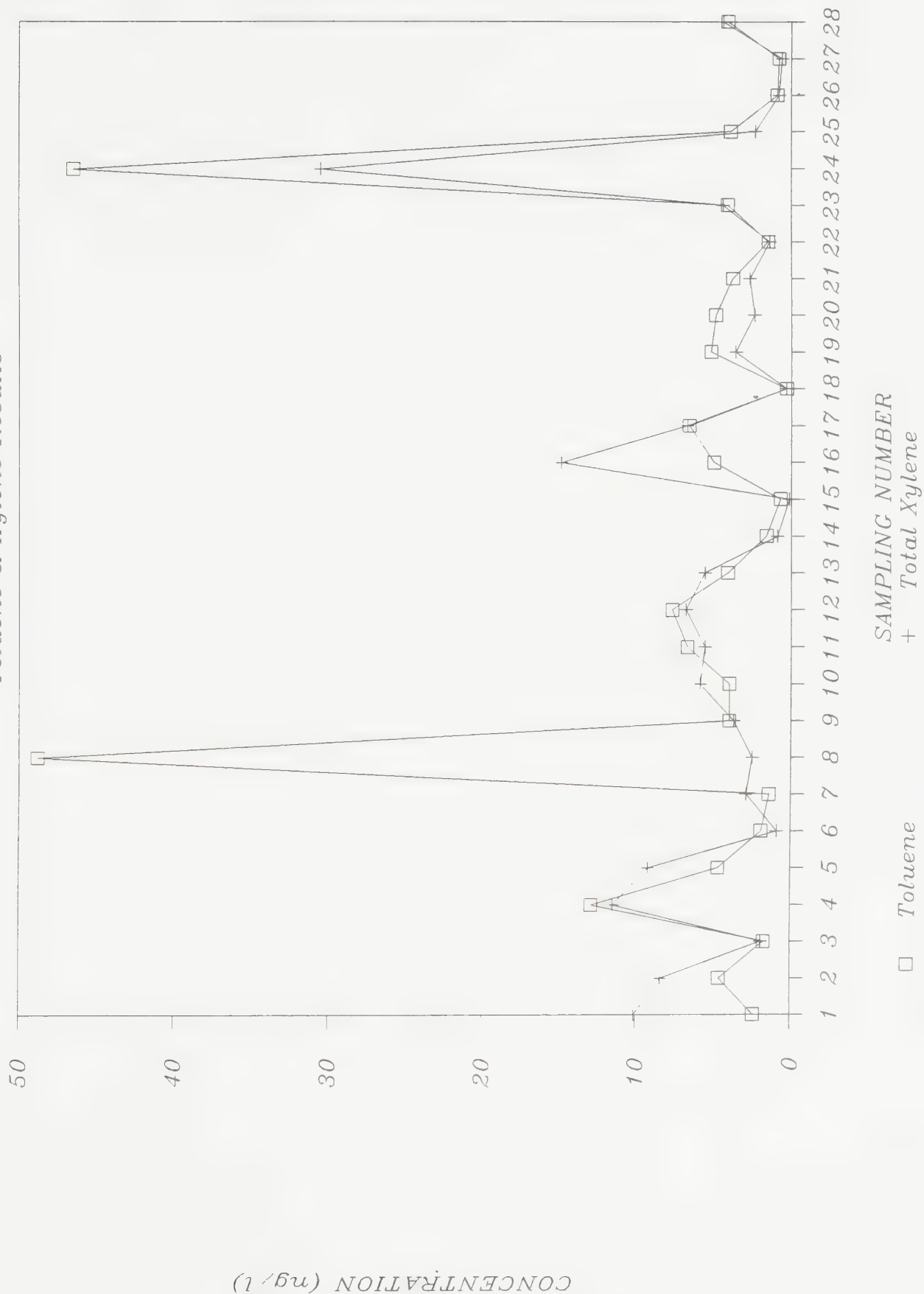
COMPOUND	SAMPLING DATE			
	#25	#26	#27	#28
	JAN 27/88	FEB 23/88	MAR 17/88	APR 27/88
	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	1.4	ND	ND	8.8
1,2-Dichloroethene (trans)	ND	ND	ND	0.7
1,1-Dichloroethane	ND	ND	ND	2.3
1,2-Dichloroethene (cis)	ND	ND	ND	0.9
Chloroform	ND	ND	ND	13.4
Tetrahydrofuran	ND	ND	ND	ND
1,1,1-Trichloroethane	0.8	ND	ND	1.6
Benzene	8.2	0.9	1.2	43.1
Trichloroethene	ND	ND	ND	1.4
1,4-Dioxane	ND	ND	ND	ND
Toluene	8.0	1.3	3.2	4.4
Tetrachloroethene	0.4	ND	ND	0.7
Ethylbenzene	4.2	1.1	3.0	0.9
m & p-Xylene	9.8	2.3	9.0	2.7
o-Xylene	3.2	0.5	2.4	1.5
Benzaldehyde	4.7	2.2	5.9	2.0
1,2,4-Trimethylbenzene	1.9	ND	0.7	1.3
Phenol	ND	ND	-	-
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	0.5
1,2-Dichlorobenzene	ND	ND	ND	BMDL
Naphthalene	BMDL	ND	BMDL	BMDL

ND - None Detected

BMDL - Below Method Detection Limit

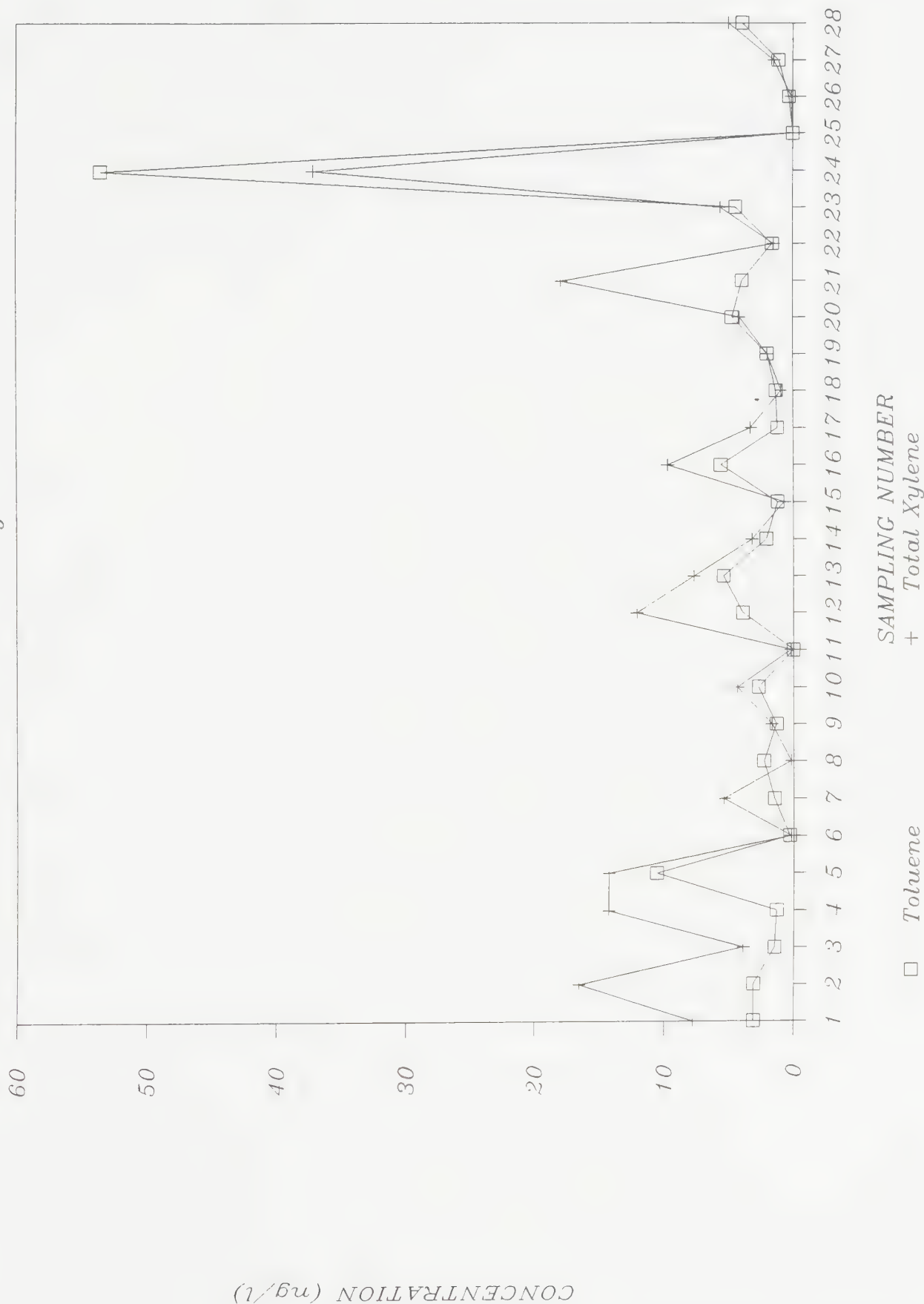
SITE #1 - WEST

Toluene & Xylene Results



SITE #2 - CENTRAL

Toluene & Xylene Results



SITE #3 - EAST

Toluene & Xylene Results

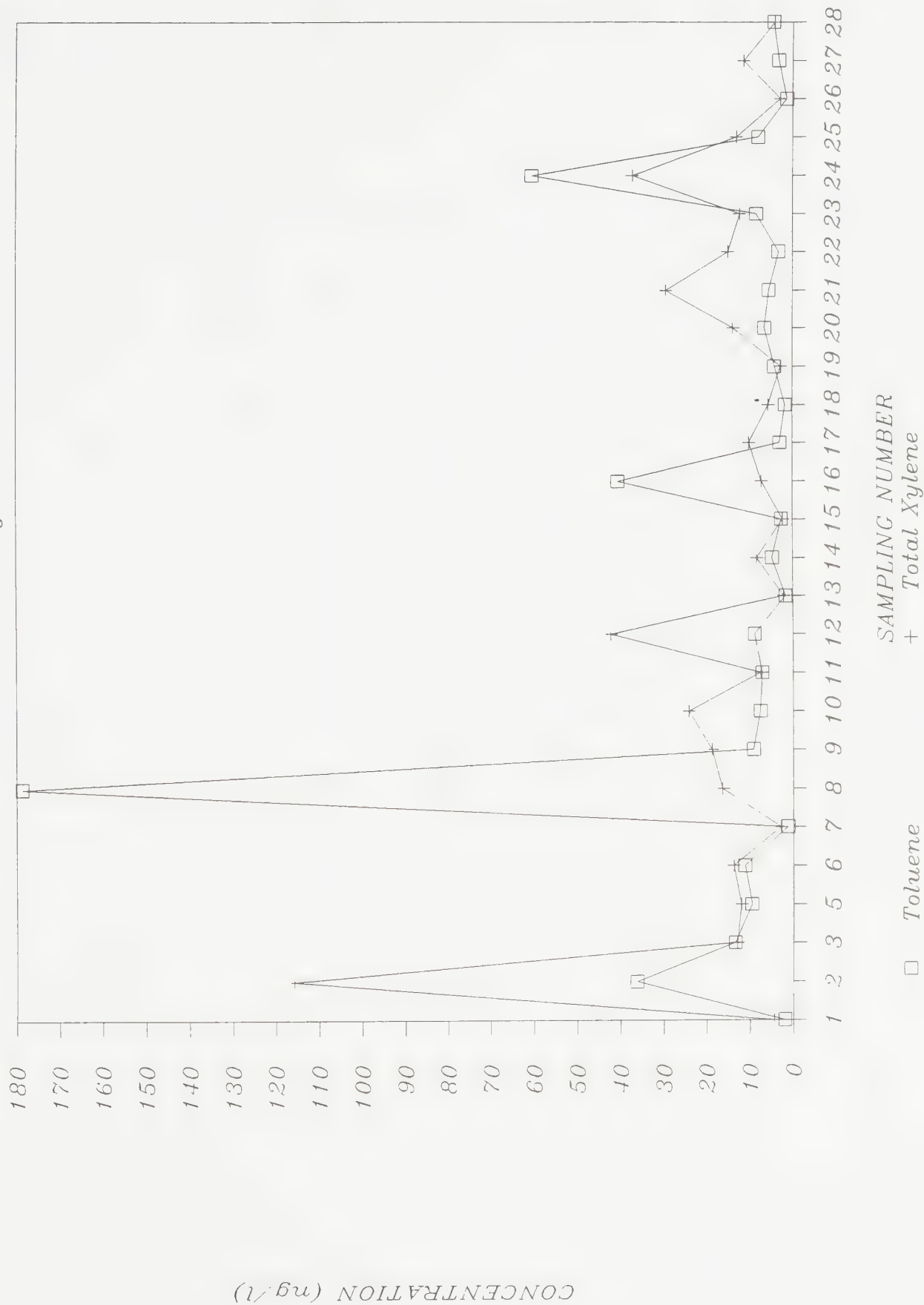


Table 4
BORE HOLE

COMPOUND	SAMPLING DATE							
	#3	#4	#5	#6	#7	#8	#9	#10
	JAN 14/86 ug/L	FEB 05/86 ug/L	FEB 26/86 ug/L	MAR 19/86 ug/L	APR 30/86 ug/L	MAY 28/86 ug/L	JUN 18/86 ug/L	JUL 23/86 ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	2.54	ND
1,2-Dichloroethene (trans)	ND	ND	ND	BMDL	ND	ND	2.73	ND
1,1-Dichloroethane	1.27	2.14	ND	2.25	ND	ND	3.11	ND
1,2-Dichloroethene (cis)	ND	1.13	ND	BMDL	ND	ND	1.76	ND
Chloroform	ND	1.37	ND	3.15	BMDL	ND	2.32	ND
Tetrahydrofuran	ND	ND	ND	3.20	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	BMDL	ND	BMDL	ND	ND	2.42	ND
Benzene	1.02	2.13	1.98	1.68	BMDL	1.25	2.84	2.96
Trichloroethene	ND	1.14	ND	ND	ND	ND	1.87	ND
1,4-Dioxane	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.67	5.23	ND	5.48	ND	BMDL	1.43	2.76
Tetrachloroethene	ND	BMDL	ND	BMDL	ND	ND	1.64	ND
Ethylbenzene	BMDL	1.83	ND	1.06	ND	BMDL	ND	1.57
m & p-Xylene	1.74	4.47	ND	2.37	ND	BMDL	1.16	5.17
o-Xylene	0.66	2.13	ND	0.79	ND	BMDL	ND	1.44
Benzaldehyde	ND	BMDL	BMDL	ND	ND	ND	BMDL	ND
1,2,4-Trimethylbenzene	ND	2.04	ND	ND	ND	ND	1.01	ND
Phenol	ND	NA	3.60	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	ND	2.50	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	1.93	ND	ND	ND	BMDL	ND	ND
1,2-Dichlorobenzene	ND	NA	NA	NA	NA	ND	ND	ND
Naphthalene	ND	3.19	ND	ND	ND	0.75	0.90	2.21

ND - None Detected
BMDL - Below Method Detection Limit

Table 4
BORE HOLE

COMPOUND	SAMPLING DATE							
	#11	#12	#13	#14	#15	#16	#17	#18
	AUG 27/86 ug/L	SEP 24/86 ug/L	NOV 05/86 ug/L	DEC 04/86 ug/L	JAN 14/87 ug/L	FEB 18/87 ug/L	MAR 18/87 ug/L	APR 30/87 ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	BMDL	ND	1.13	ND	BMDL	ND	ND	ND
1,1-Dichloroethane	2.55	BMDL	7.34	BMDL	1.27	ND	1.19	BMDL
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	BMDL	ND	BMDL	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	19.70	8.61	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	2.67	0.82	4.63	0.93	1.24	1.35	1.11	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	BMDL	ND	ND	ND	ND
Toluene	2.33	0.70	4.60	0.98	1.31	1.64	0.92	BMDL
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1.18	BMDL	3.80	1.46	1.15	BMDL	BMDL	BMDL
m & p-Xylene	2.55	1.32	2.53	2.11	1.88	BMDL	0.64	BMDL
o-Xylene	0.90	BMDL	1.92	1.62	1.12	BMDL	ND	BMDL
Benzaldehyde	2.45	ND	ND	BMDL	ND	ND	ND	BMDL
1,2,4-Trimethylbenzene	BMDL	BMDL	ND	ND	ND	ND	ND	ND
Phenol	NA	NA	13.56	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	2.42	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	ND	ND	ND	ND	BMDL
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	1.91	0.63	ND	ND	ND	ND	ND	3.06

ND - None Detected
BMDL - Below Method Detection Limit

Table 4
BORE HOLE

COMPOUND	SAMPLING DATE							
	#19	#20	#21	#22	#23	#24	#25	#26
	MAY 21/87	JUN 24/87	JUL 23/87	AUG 20/87	SEP 24/87	NOV 26/87	JAN 27/88	FEB 23/88
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	ND	BMDL	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	BMDL	1.12	1.85	BMDL	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	BMDL	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	1.00	BMDL	ND	ND	BMDL
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ND	1.09	BMDL	ND	ND	ND	ND	ND
Toluene	BMDL	0.73	BMDL	BMDL	ND	1.35	ND	0.67
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	BMDL	1.62	BMDL	BMDL	ND	ND	ND	ND
m & p-Xylene	BMDL	2.70	BMDL	BMDL	ND	BMDL	ND	0.98
o-Xylene	BMDL	0.92	BMDL	BMDL	ND	ND	ND	ND
Benzaldehyde	ND	13.50	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	BMDL	BMDL	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	BMDL	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	BMDL	BMDL	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	BMDL	ND	ND	ND	ND	ND
Naphthalene	ND	7.58	BMDL	ND	ND	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 4
BORE HOLE

COMPOUND	SAMPLING DATE	
	#27	#28
	MAR 17/88 ug/L	APR 27/88 ug/L
1,1-Dichloroethene	ND	ND
1,2-Dichloroethene (trans)	ND	ND
1,1-Dichloroethane	ND	ND
1,2-Dichloroethene (cis)	ND	ND
Chloroform	ND	ND
Tetrahydrofuran	ND	ND
1,1,1-Trichloroethane	ND	ND
Benzene	nd	ND
Trichloroethene	ND	ND
1,4-Dioxane	ND	ND
Toluene	nd	0.79
Tetrachloroethene	ND	ND
Ethylbenzene	ND	BMDL
m & p-Xylene	0.93	0.50
o-Xylene	ND	BMDL
Benzaldehyde	ND	ND
1,2,4-Trimethylbenzene	ND	ND
Phenol	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	BMDL
1,2-Dichlorobenzene	ND	ND
Naphthalene	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 5
TEST WELL

COMPOUND	SAMPLING DATE							
	#3	#4	#5	#6	#7	#8	#9	#10
	JAN 14/86 ug/L	FEB 05/86 ug/L	FEB 26/86 ug/L	MAR 19/86 ug/L	APR 30/86 ug/L	MAY 28/86 ug/L	JUN 18/86 ug/L	JUL 23/86 ug/L
1,1-Dichloroethene	8.66	ND	ND	ND	ND	ND	1.85	ND
1,2-Dichloroethene (trans)	ND	2.07	ND	ND	ND	ND	3.79	ND
1,1-Dichloroethane	17.53	12.63	14.40	17.16	9.92	14.53	14.39	10.44
1,2-Dichloroethene (cis)	2.24	BMDL	ND	4.02	ND	ND	2.27	ND
Chloroform	ND	6.76	ND	ND	ND	ND	3.12	ND
Tetrahydrofuran	26.20	26.61	ND	ND	14.98	27.22	23.71	39.13
1,1,1-Trichloroethane	6.27	5.96	2.50	9.48	4.16	4.90	6.88	3.75
Benzene	20.57	20.33	17.62	15.51	14.06	22.27	15.57	29.73
Trichloroethene	BMDL	BMDL	ND	ND	ND	ND	ND	ND
1,4-Dioxane	6.28	3.17	ND	ND	ND	3.88	ND	ND
Toluene	267.72	193.31	64.24	90.32	143.96	174.51	98.31	203.35
Tetrachloroethene	ND	BMDL	ND	ND	ND	ND	2.15	ND
Ethylbenzene	94.05	113.08	107.97	103.25	158.29	165.80	33.94	62.36
m & p-Xylene	223.72	256.47	225.39	222.66	392.11	337.18	72.06	108.52
o-Xylene	77.55	55.37	74.75	66.32	90.87	89.43	17.20	24.91
Benzaldehyde	ND	ND	ND	ND	ND	ND	11.53	ND
1,2,4-Trimethylbenzene	15.24	28.67	26.31	5.80	50.37	60.63	4.80	ND
Phenol	ND	NA	8.01	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	ND	BMDL	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	ND	ND	BMDL	1.61	ND
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	ND	ND	ND
Naphthalene	ND	ND	1.58	ND	ND	0.67	BMDL	1.13

ND - None Detected
BMDL - Below Method Detection Limit

Table 5
TEST WELL

COMPOUND	SAMPLING DATE							
	#11	#12	#13	#14	#15	#16	#17	#18
	AUG 27/86 ug/L	SEP 24/86 ug/L	NOV 05/86 ug/L	DEC 04/86 ug/L	JAN 14/87 ug/L	FEB 18/87 ug/L	MAR 18/87 ug/L	APR 30/87 ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	BMDL	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	ND	BMDL	ND
1,1-Dichloroethane	1.52	2.05	18.13	6.93	3.84	ND	4.78	7.53
1,2-Dichloroethene (cis)	BMDL	1.30	6.63	ND	12.33	ND	BMDL	ND
Chloroform	ND	ND	1.22	ND	ND	ND	ND	ND
Tetrahydrofuran	22.18	23.88	52.86	19.78	ND	14.38	ND	14.68
1,1,1-Trichloroethane	BMDL	BMDL	ND	2.61	ND	ND	5.92	3.03
Benzene	12.37	17.39	30.21	9.48	2.63	14.45	4.48	11.29
Trichloroethene	ND	ND	ND	ND	4.99	ND	ND	ND
1,4-Dioxane	2.48	5.63	8.16	BMDL	ND	ND	ND	ND
Toluene	65.30	149.72	291.72	48.41	71.02	18.71	3.46	12.52
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	35.30	78.25	130.97	53.94	13.57	57.41	4.34	15.52
m & p-Xylene	59.82	127.40	205.68	101.11	27.55	94.25	8.35	21.37
o-Xylene	12.11	27.96	46.27	23.51	8.12	13.40	3.14	3.14
Benzaldehyde	ND	ND	3.01	ND	ND	ND	ND	BMDL
1,2,4-Trimethylbenzene	1.74	7.50	11.98	7.11	ND	5.72	2.12	ND
Phenol	NA	NA	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	BMDL	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 5
TEST WELL

COMPOUND	SAMPLING DATE							
	#19	#20	#21	#22	#23	#24	#25	#26
	MAY 21/87	JUN 24/87	JUL 23/87	AUG 20/87	SEP 24/87	NOV 26/87	JAN 27/88	FEB 23/88
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	ND	ND	BMDL	ND	ND	ND	ND	ND
1,1-Dichloroethane	1.81	1.82	1.40	1.02	6.95	4.03	ND	2.16
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	3.46	8.32	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.50	9.30	9.96	17.97	9.38	6.04	0.89	3.32
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ND	1.12	ND	ND	ND	ND	ND	ND
Toluene	1.54	2.24	1.24	2.62	1.40	22.01	4.79	1.16
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.96	19.12	23.14	34.38	18.98	9.44	5.71	7.55
m & p-Xylene	1.55	17.74	22.97	38.48	22.79	8.45	7.46	11.28
o-Xylene	BMDL	0.80	0.88	1.33	BMDL	1.65	1.30	1.20
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	BMDL	1.30	ND	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	BMDL	BMDL	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	1.60	ND	ND	ND	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 5
TEST WELL

COMPOUND	SAMPLING DATE	
	#27	#28
	MAR 17/88 ug/L	APR 27/88 ug/L
1,1-Dichloroethene	ND	ND
1,2-Dichloroethene (trans)	ND	ND
1,1-Dichloroethane	6.09	5.97
1,2-Dichloroethene (cis)	ND	ND
Chloroform	ND	ND
Tetrahydrofuran	ND	ND
1,1,1-Trichloroethane	ND	2.37
Benzene	5.39	2.22
Trichloroethene	ND	ND
1,4-Dioxane	ND	ND
Toluene	1.82	3.24
Tetrachloroethene	ND	ND
Ethylbenzene	9.61	8.99
m & p-Xylene	13.89	12.39
o-Xylene	1.14	1.54
Benzaldehyde	ND	ND
1,2,4-Trimethylbenzene	ND	ND
Phenol	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
Naphthalene	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 6
VENT PROBE #1

COMPOUND	SAMPLING DATE	
	#19	
	MAY 21/87	
	ug/L	
1,1-Dichloroethene	ND	
1,2-Dichloroethene (trans)	ND	
1,1-Dichloroethane	ND	
1,2-Dichloroethene (cis)	ND	
Chloroform	ND	
Tetrahydrofuran	ND	
1,1,1-Trichloroethane	ND	
Benzene	ND	
Trichloroethene	ND	
1,4-Dioxane	ND	
Toluene	0.58	
Tetrachloroethene	ND	
Ethylbenzene	3.80	
m & p-Xylene	1.52	
o-Xylene	BMDL	
Benzaldehyde	ND	
1,2,4-Trimethylbenzene	ND	
Phenol	ND	
1,3-Dichlorobenzene	ND	
1,4-Dichlorobenzene	ND	
1,2-Dichlorobenzene	ND	
Naphthalene	ND	

ND - None Detected
BMDL - Below Method Detection Limit

Table 7
VENT PROBE #2 SHORT

COMPOUND	SAMPLING DATE	
	#25	
	JAN 27/88	
	ug/L	
-----	-----	
1,1-Dichloroethene	ND	
1,2-Dichloroethene (trans)	ND	
1,1-Dichloroethane	ND	
1,2-Dichloroethene (cis)	ND	
Chloroform	ND	
Tetrahydrofuran	ND	
1,1,1-Trichloroethane	ND	
Benzene	ND	
Trichloroethene	ND	
1,4-Dioxane	ND	
Toluene	ND	
Tetrachloroethene	ND	
Ethylbenzene	7.62	
m & p-Xylene	14.91	
o-Xylene	1.17	
Benzaldehyde	ND	
1,2,4-Trimethylbenzene	ND	
Phenol	ND	
1,3-Dichlorobenzene	ND	
1,4-Dichlorobenzene	ND	
1,2-Dichlorobenzene	ND	
Naphthalene	ND	

ND - None Detected

BMDL - Below Method Detection Limit

Table 8
VENT PROBE #2 TALL

COMPOUND	SAMPLING DATE						
	#3	#6	#8	#11	#22	#24	#27
	JAN 14/86	MAR 19/86	MAY 28/86	AUG 27/86	AUG 20/87	NOV 26/87	MAR 17/88
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	3.6	5.39	4.63	BMDL	BMDL	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	25.3	22.66	27.51	11.69	ND	ND	ND
1,1,1-Trichloroethane	ND	BMDL	ND	ND	ND	ND	ND
Benzene	10.2	14.13	18.53	7.92	14.94	9.32	1.27
Trichloroethene	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane	BMDL	ND	ND	ND	ND	ND	ND
Toluene	95.7	57.66	203.22	32.25	40.24	22.77	1.93
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	67.3	78.62	140.78	17.04	38.18	33.39	3.79
m & p-Xylene	188.0	181.16	343.78	35.99	93.40	59.96	9.69
o-Xylene	48.2	53.26	83.73	6.85	16.37	14.79	1.38
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	1.8	13.77	26.55	ND	4.58	ND	ND
Phenol	ND	NA	NA	NA	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	NA	ND	ND	ND	ND	ND
Naphthalene	ND	ND	BMDL	0.86	ND	ND	ND

ND - None Detected

BMDL - Below Method Detection Limit

Table 9
VENT PROBE #3 SHORT

COMPOUND	SAMPLING DATE							
	#3	#4	#5	#6	#7	#9	#13	#14
	JAN 14/86 ug/l	FEB 05/86 ug/L	FEB 26/86 ug/l	MAR 19/86 ug/L	APR 30/86 ug/l	JUN 18/86 ug/L	NOV 05/86 ug/l	DEC 04/86 ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	BMDL	1.08	ND	ND	ND	1.78	2.54	BMDL
1,1-Dichloroethane	1.21	1.34	ND	3.16	ND	2.41	4.18	1.36
1,2-Dichloroethene (cis)	BMDL	BMDL	ND	2.55	ND	ND	ND	BMDL
Chloroform	ND	BMDL	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	56.76	45.68	45.68	46.63	32.58	59.02	113.27	30.28
1,1,1-Trichloroethane	ND	BMDL	ND	BMDL	ND	1.00	ND	ND
Benzene	12.81	16.91	12.24	12.78	10.63	14.17	32.40	11.67
Trichloroethene	ND	BMDL	ND	ND	ND	BMDL	ND	ND
1,4-Dioxane	7.53	ND	ND	ND	ND	11.17	16.52	1.37
Toluene	613.53	499.76	218.98	191.68	432.58	345.19	403.09	93.77
Tetrachloroethene	ND	BMDL	ND	ND	ND	BMDL	ND	ND
Ethylbenzene	133.79	130.41	105.04	93.46	163.30	50.81	196.61	83.27
m & p-Xylene	346.88	338.52	223.51	237.81	473.13	116.64	271.71	171.62
o-Xylene	137.06	112.70	104.60	100.86	116.73	26.68	43.35	30.92
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	29.97	19.00	16.45	41.77	5.88	7.69	6.27
Phenol	ND	NA	2.84	NA	NA	NA	ND	ND
1,3-Dichlorobenzene	ND	BMDL	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	NA	NA	NA	NA	ND	ND	ND
Naphthalene	ND	ND	BMDL	ND	ND	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 9
VENT PROBE #3 SHORT

COMPOUND	SAMPLING DATE				
	#17	#19	#23	#26	#27
	MAR 18/87 ug/l	MAY 21/87 ug/L	SEP 24/87 ug/l	FEB 23/88 ug/L	MAR 17/88 ug/l
1,1-Dichloroethene	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND
1,1-Dichloroethane	BMDL	ND	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND
Tetrahydrofuran	19.93	13.11	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
Benzene	5.45	2.20	1.10	2.57	6.37
Trichloroethene	ND	ND	ND	ND	ND
1,4-Dioxane	5.55	4.77	ND	ND	ND
Toluene	63.27	29.51	22.25	1.39	1.72
Tetrachloroethene	ND	ND	ND	ND	ND
Ethylbenzene	44.98	23.62	16.83	14.03	13.42
m & p-Xylene	101.54	60.03	44.32	32.43	29.28
o-Xylene	21.25	12.17	7.55	3.91	4.72
Benzaldehyde	ND	BMDL	ND	ND	ND
1,2,4-Trimethylbenzene	6.65	ND	ND	ND	ND
Phenol	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1.52	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 10
VENT PROBE #3 TALL

COMPOUND	SAMPLING DATE				
	#9	#16	#18	#20	#21
	JUN 18/86 ug/L	FEB 18/87 ug/L	APR 30/87 ug/L	JUN 24/87 ug/L	JUL 23/87 ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	1.82	ND	ND	ND	ND
1,1-Dichloroethane	3.72	ND	BMDL	BMDL	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND
Chloroform	1.80	ND	ND	BMDL	BMDL
Tetrahydrofuran	36.64	11.97	26.36	6.24	ND
1,1,1-Trichloroethane	1.96	ND	ND	ND	ND
Benzene	18.74	12.98	9.36	4.67	2.75
Trichloroethene	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	6.92	ND	ND
Toluene	8.95	13.82	91.63	30.83	BMDL
Tetrachloroethene	1.38	ND	ND	ND	ND
Ethylbenzene	27.65	83.26	57.31	24.33	23.22
m & p-Xylene	46.80	192.61	119.38	54.57	40.23
o-Xylene	2.27	20.98	25.54	6.97	2.13
Benzaldehyde	ND	ND	4.35	ND	ND
1,2,4-Trimethylbenzene	ND	5.72	4.92	1.50	2.18
Phenol	NA	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	BMDL	ND	ND	8.48	BMDL
1,2-Dichlorobenzene	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	3.67	BMDL

ND - None Detected
BMDL - Below Method Detection Limit

Table 11
VENT PROBE #4

COMPOUND	SAMPLING DATE				
	#5	#10	#15	#22	#28
	FEB 26/86	JUL 23/86	JAN 14/87	AUG 20/87	APR 27/88
	ug/L	ug/L	ug/L	ug/L	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	BMDL	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND
Tetrahydrofuran	35.71	52.73	2.49	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
Benzene	11.70	22.82	12.40	10.19	2.58
Trichloroethene	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	ND	ND
Toluene	12.34	37.37	34.76	1.50	0.87
Tetrachloroethene	ND	ND	ND	ND	ND
Ethylbenzene	63.26	86.59	89.14	36.96	13.73
m & p-Xylene	150.50	163.74	180.04	87.88	27.54
o-Xylene	33.82	20.37	25.02	4.29	2.46
Benzaldehyde	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	6.61	ND	5.49	3.52	ND
Phenol	3.44	NA	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	NA	ND	ND	ND	ND
Naphthalene	BMDL	3.10	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 12
VENT PROBE #6 SHORT

COMPOUND	SAMPLING DATE			
	#11	#12	#14	#23
	AUG 27/86 ug/L	SEP 24/86 ug/L	DEC 04/86 ug/L	SEP 24/87 ug/L
1,1-Dichloroethene	ND	ND	ND	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND
1,1-Dichloroethane	BMDL	ND	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND
Chloroform	ND	ND	1.27	ND
Tetrahydrofuran	31.54	33.41	17.54	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
Benzene	8.14	6.12	3.66	ND
Trichloroethene	ND	ND	ND	ND
1,4-Dioxane	5.32	8.62	1.65	ND
Toluene	34.93	26.82	8.04	ND
Tetrachloroethene	ND	ND	ND	ND
Ethylbenzene	27.28	37.97	22.10	ND
m & p-Xylene	62.44	88.43	46.45	BMDL
o-Xylene	9.20	12.18	3.77	ND
Benzaldehyde	ND	ND	ND	ND
1,2,4-Trimethylbenzene	1.35	3.76	ND	ND
Phenol	NA	NA	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
Naphthalene	0.59	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 13
VENT PROBE #6 TALL

COMPOUND	SAMPLING DATE					
	#7	#10	#13	#17	#20	#26
	APR 30/86	JUL 23/86	NOV 05/86	MAR 18/87	JUN 24/87	FEB 23/88
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	4.00	ND
1,2-Dichloroethene (trans)	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	1.20	BMDL	ND	ND
1,2-Dichloroethene (cis)	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	26.18	56.21	67.51	8.41	15.36	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Benzene	32.37	23.20	16.36	15.43	18.15	6.51
Trichloroethene	ND	ND	ND	ND	ND	ND
1,4-Dioxane	ND	ND	ND	1.32	ND	ND
Toluene	294.38	121.01	9.12	11.64	1.27	1.22
Tetrachloroethene	ND	ND	ND	ND	ND	ND
Ethylbenzene	188.38	45.99	55.56	61.73	31.24	16.37
m & p-Xylene	504.89	105.10	101.63	132.54	37.22	28.74
o-Xylene	129.13	16.31	7.45	18.16	1.44	4.14
Benzaldehyde	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	55.62	ND	3.28	7.79	BMDL	ND
Phenol	NA	NA	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	BMDL	ND
1,2-Dichlorobenzene	NA	ND	ND	ND	ND	ND
Naphthalene	ND	1.93	ND	ND	2.11	ND

ND - None Detected
BMDL - Below Method Detection Limit

Table 14
VENT PROBE #7

COMPOUND	SAMPLING DATE							
	#4	#8	#12	#15	#16	#18	#21	#24
	FEB 05/86	MAY 28/86	SEP 24/86	JAN 14/87	FEB 18/87	APR 30/87	JUL 23/87	NOV 26/87
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
chloroethene	ND	ND	ND	ND	ND	ND	ND	ND
chloroethene (trans)	BMDL	ND	ND	ND	ND	ND	ND	ND
chloroethane	1.00	BMDL	ND	ND	ND	ND	ND	ND
chloroethene (cis)	BMDL	ND	ND	ND	ND	ND	ND	ND
form	BMDL	ND	ND	ND	ND	ND	BMDL	ND
ydrofuran	ND	11.62	8.81	ND	ND	5.98	ND	ND
Trichloroethane	BMDL	ND	ND	ND	ND	ND	ND	ND
e	14.57	22.77	11.99	4.96	5.65	7.33	ND	2.69
oroethene	1.76	ND	ND	ND	ND	ND	ND	ND
oxane	ND	ND	ND	ND	ND	ND	ND	ND
e	29.76	94.43	21.39	0.98	1.62	0.66	2.77	1.22
hloroethene	BMDL	ND	ND	ND	ND	ND	ND	ND
enene	53.19	134.96	47.38	16.49	25.88	21.74	12.46	12.17
Xylene	96.26	211.97	43.23	9.46	29.17	4.89	16.92	3.42
ne	21.25	69.01	7.33	0.86	2.72	0.64	2.49	BMDL
deh	ND	ND	ND	ND	ND	ND	ND	ND
Trimethylbenzene	5.88	31.35	1.11	ND	ND	ND	1.23	BMDL
	NA	NA	NA	ND	ND	ND	ND	ND
chlorobenzene	BMDL	ND	ND	ND	ND	ND	ND	ND
chlorobenzene	BMDL	BMDL	BMDL	ND	ND	BMDL	BMDL	ND
chlorobenzene	NA	ND	ND	ND	ND	ND	ND	ND
alene	ND	BMDL	ND	ND	ND	ND	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

Handwritten text, likely bleed-through from the reverse side of the page. The text is illegible due to extreme fading and blurring.

Table 14
VENT PROBE #7

COMPOUND	SAMPLING DATE	
	#25	#28
	JAN 27/88	APR 27/88
	ug/L	ug/L
1,1-Dichloroethene	ND	ND
1,2-Dichloroethene (trans)	ND	ND
1,1-Dichloroethane	ND	ND
1,2-Dichloroethene (cis)	ND	ND
Chloroform	ND	ND
Tetrahydrofuran	ND	ND
1,1,1-Trichloroethane	ND	ND
Benzene	2.91	ND
Trichloroethene	ND	ND
1,4-Dioxane	ND	ND
Toluene	2.10	0.50
Tetrachloroethene	ND	ND
Ethylbenzene	16.25	7.30
m & p-Xylene	26.46	6.45
o-Xylene	3.51	1.34
Benzaldehyde	ND	ND
1,2,4-Trimethylbenzene	ND	ND
Phenol	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
Naphthalene	ND	ND

ND - None Detected
BMDL - Below Method Detection Limit

I trust that the foregoing meets with your requirements,
and that you will call me if you have any questions.

Yours truly,

MANN TESTING LABORATORIES LTD.


W.R. Burgess, B.Sc.
Manager, Occupational Health

TABLE 1

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis Sorbent Tube Method

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS			
	Site #1 ng/L	Site #2 ng/L	Site #3 ng/L	MDL ng/L
1,1-Dichloroethene	0.6	0.3	0.3	0.3
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
Chloroform	BMDL	BMDL	BMDL	0.2
1,1,1-Trichloroethane	1.1	0.7	0.7	0.2
Benzene	1.0	0.8	0.7	0.1
Trichloroethene	BMDL	BMDL	BMDL	0.2
Toluene	2.4	3.1	1.9	0.1
Tetrachloroethene	0.4	0.5	0.5	0.2
Ethylbenzene	1.3	1.6	1.0	0.1
m & p-Xylene	8.8	6.5	3.8	0.1
o-Xylene	1.3	1.3	0.7	0.1
Benzaldehyde	4.3	3.1	3.6	0.5
1,2,4-Trimethylbenzene	2.6	1.9	1.2	0.2
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	0.7	0.5	BMDL	0.5
Phenol	ND	ND	ND	20.0
1,4-Dioxane	ND	ND	ND	2.0

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

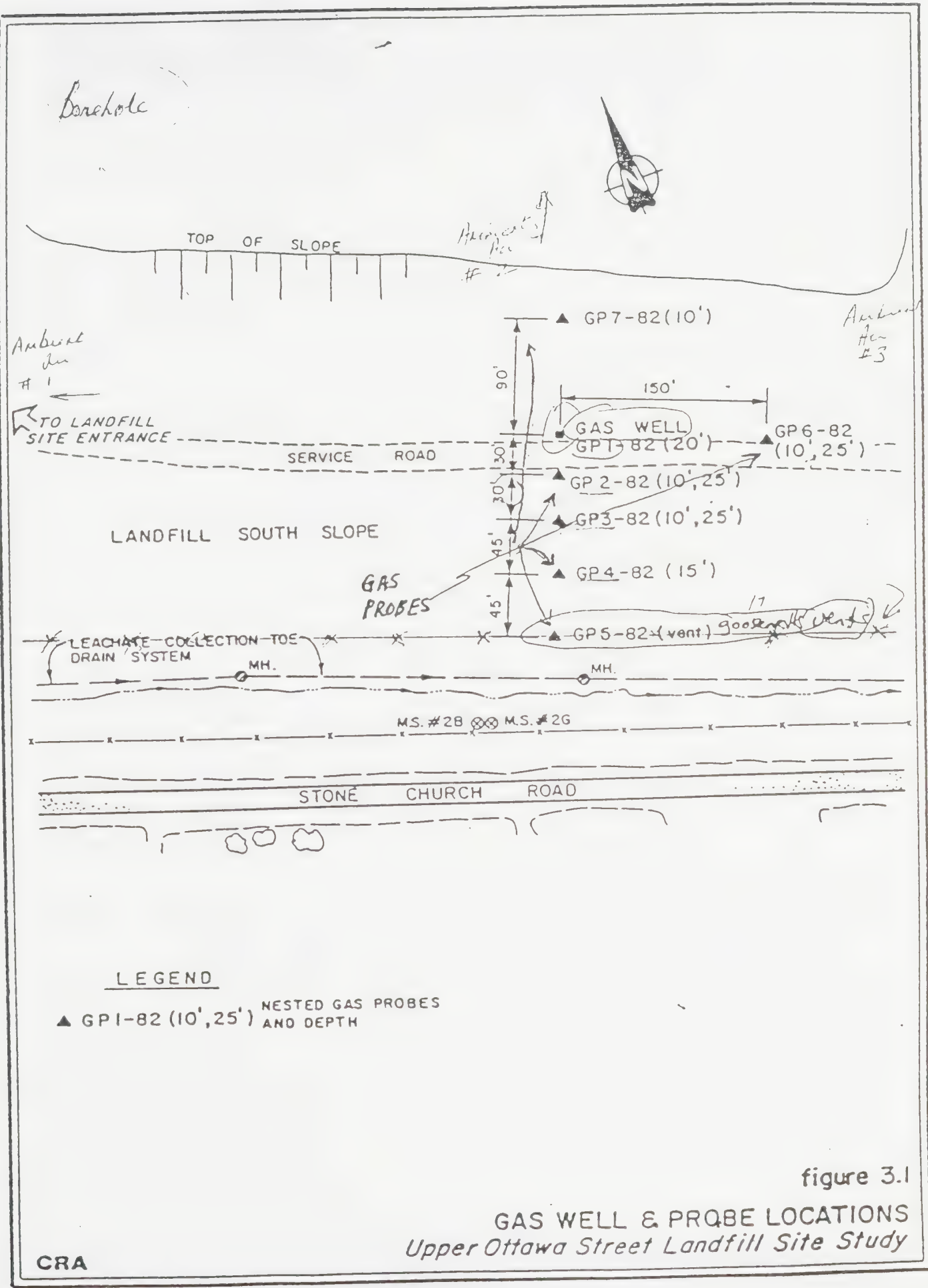


figure 3.1

GAS WELL & PROBE LOCATIONS
Upper Ottawa Street Landfill Site Study



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

December 21, 1985

Regional Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

ATTN: Mr. G. Dykeman

RE: Mann Testing File 852879/3401/1
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

During the latter stages of the Upper Ottawa Landfill Project, the analysis of air bag samples that were collected directly from the gooseneck vents, produced unexpected results, in that the predicted near anaerobic state was not in evidence. Further investigation by Dr. Bournes and Ms. Anne Koven revealed that up to two-thirds of the goosenecks, produced little or no flow from evolved landfill gases, and it was concluded that results of further samples collected from this source would not provide meaningful information.

I understand from Ms. Koven, that she has since discussed this with yourself and that you have agreed that alternate sampling locations be selected to replace the composite sampling from the gooseneck vents, as called for in the original protocol. In further discussion with Anne Koven, she suggested that the most useful data might be obtained from analysis of passive samples collected at: (1) the borehole located on top and at the west end of the landfill; (2) at the experimental test well, located near the access road on the south side of the landfill above the gooseneck vents; and (3) from the two most active gas probes, that surround the test well. The approximate locations are shown on the attached map.

The first sampling for the Region project was carried out October 30, 1985 and included three 60 liter ambient air samples from the east, west and central locations; and four bag samples from the bore hole, test well and test probes #2A (tall) and #4. The ambient air sample locations were the same as those previously staked out, except for eastern location that has now been set up near the access road just below the top of the landfill

The ambient air samples were analysed the following day using gas chromatography mass spectrometry (GC/MS). Thermal desorption of the samples was accomplished using a Universal Automated Concentrator, UNACON Model 810, to release the trapped organics for subsequent separation and analysis. The analytical parameters used are shown as follows:

Mass Spectrometer	Finnigan Model 3200	-
Concentrator	UNACON Model 810	
GC Column	30 meter SE30, 0.5 mm ID	
Temperature Programming	Initial Temperature	40°C
	Initial Hold	5 minutes
	Program rate	10°C/min
	Final Temperature	240°C
	Final Hold	10 min.

The analytical results are presented in Table 1 with the concentrations being expressed in nanograms per liter. The site locations refer to #1 West, #2 Central and #3 East.

Analysis of the bag samples by gas chromatography equipped with thermal conductivity (TC) flame ionization (FID) and Electron Capture (EC) detectors, produced the following results:

	<u>Test Well</u>	<u>Probe 2A</u>	<u>Borehole</u>	<u>Probe 4</u>
Methane %	70.8	74.4	71.6	73.2
Carbon Dioxide %	27.6	23.9	26.8	25.1
Oxygen %	0.5	0.2	0.2	0.3
Nitrogen %	0.9	0.7	0.7	0.8
Total Hydrocarbon (non methane)*	434	489	253	476

* parts per million as methane equivalents
(i.e. as 1 carbon molecule or compound)

During our telephone conversation of November 29, 1985 the project schedule and distribution of funds were agreed upon, and the number of sampling periods in each of the second and third years, have been reduced by one, to 10 and 11 respectively. The schedule is shown as follows:

1) Equipment Expenditures (Canadian Funds)

Traps and Sorbent Tubes	\$ 812.00
Electrical Accessories	150.00
Rechargeable Batteries	150.00
Battery Charger	80.00
Pump Housing - Construction Material	535.00
Flow Rotameters	1116.00
Pumps (3 large and 3 small)	830.00
Labour - Construction and Testing	1940.00
(10 Tech man days @ \$194)	-----
TOTAL	\$5613.00

2) Project Allocation Funds	\$70000.00
Less Equipment Expenditures	5613.00

	\$64387.00

Price per sampling (2235.00)
 Number of samplings (64387 : 2235) = 28.8

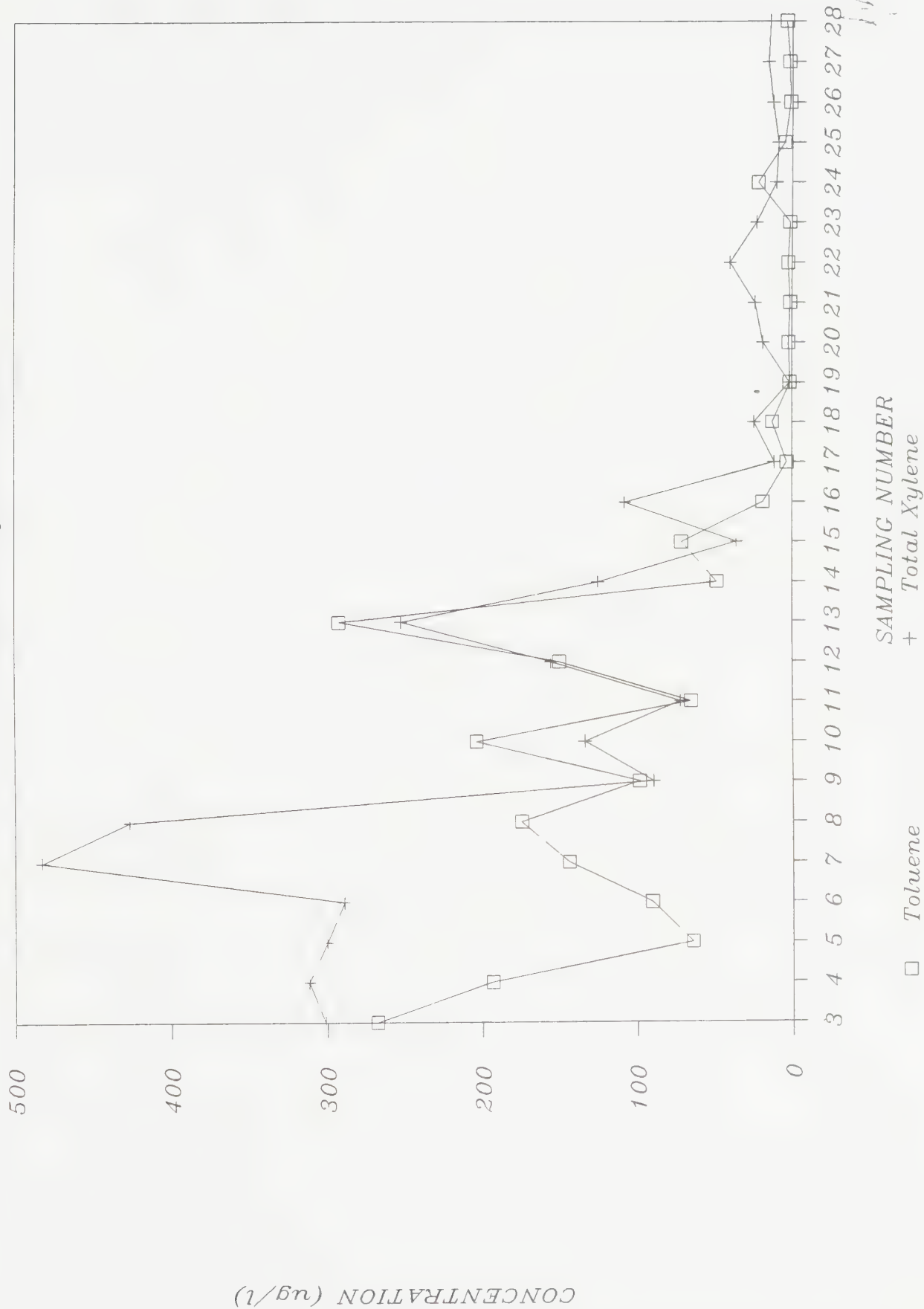
3) Schedule

a) Fiscal year ending March 31/86	
6 samplings at \$2235	\$13410.00
Equipment & expenditures	<u>5613.00</u>
b) Fiscal year ending March 31/87	
10 samplings at \$2235	\$22350.00
c) Fiscal year ending March 31/88	
11 samplings at \$2235.00	<u>\$24585.00</u>
TOTAL	\$65958.00

In accordance with your instructions, invoices will be submitted semianually in March and September to project completion. Equipment expenditures will be included with the initial invoice.

TESTWELL

Toluene & Xylene Results



VENT PROBE #3 SHORT

Toluene & Xylene Results

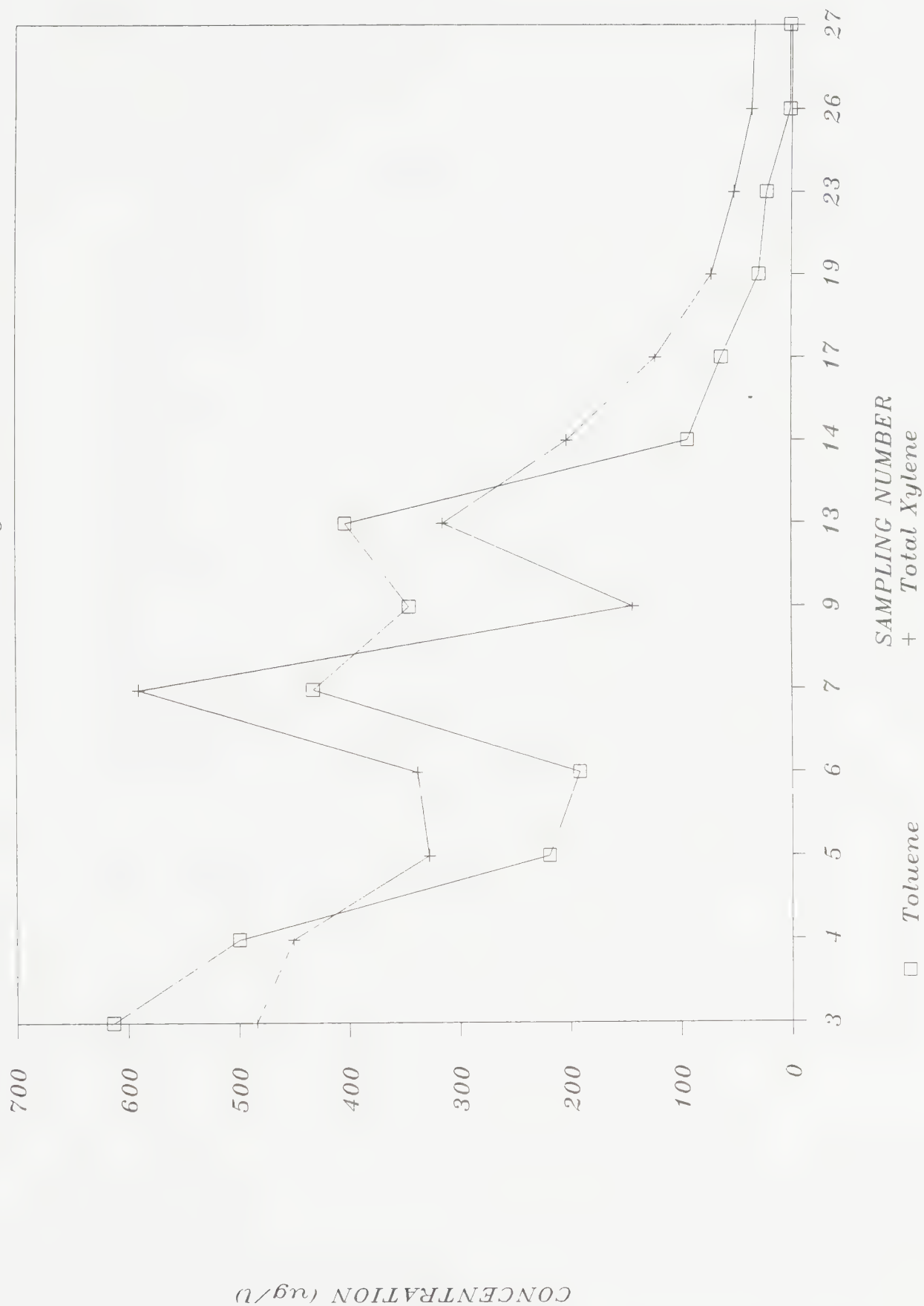


Table 15
Method Detection Limits

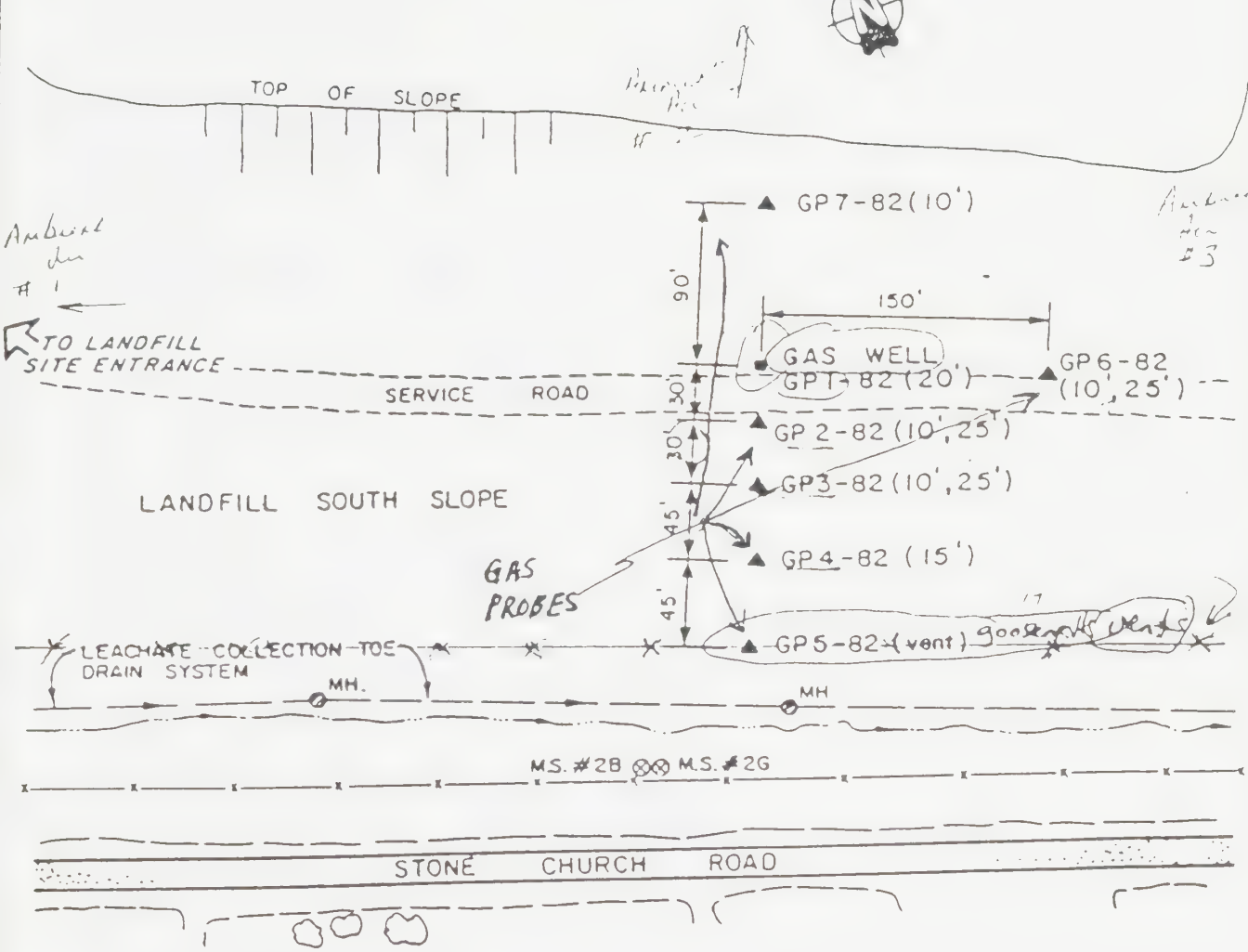
COMPOUND	Method	
	Sorbent	Bag
	Tube ng/L	Sample ug/L
1,1-Dichloroethene	0.3	1.5
1,2-Dichloroethene (trans)	0.2	1.0
1,1-Dichloroethane	0.2	1.0
1,2-Dichloroethene (cis)	0.2	1.0
Chloroform	0.2	1.0
Tetrahydrofuran	0.2	1.0
1,1,1-Trichloroethane	0.2	1.0
Benzene	0.1	0.5
Trichloroethene	0.2	1.0
1,4-Dioxane	2.0	5.0
Toluene	0.1	0.5
Tetrachloroethene	0.2	1.0
Ethylbenzene	0.1	0.5
m & p-Xylene	0.1	0.5
o-Xylene	0.1	0.5
Benzaldehyde	0.5	2.5
1,2,4-Trimethylbenzene	0.2	1.0
Phenol	20.0	10.0
1,3-Dichlorobenzene	0.3	1.5
1,4-Dichlorobenzene	0.3	1.5
1,2-Dichlorobenzene	0.3	1.5
Naphthalene	0.5	0.5

ND - None Detected
BMDL - Below Method Detection Limit

Table 16
WEATHER CONDITIONS DURING SAMPLING

Number of Sampling	Date of Sampling	Temperature (degrees C)		Wind Direction	Wind Velocity (km/hr)		Relative Humidity (%)	
		Low	High		Low	High	Low	High
1	Oct 30/85	-	-	-	-	-	-	-
2	Nov 27/85	2.0		N	-	-	-	-
3	Jan 14/86	-18.0		SW	20		66	
4	Feb 05/86	1.0	1.0	NNE	9	24	94	100
5	Feb 26/86	-7.6	-10.3	SSE - E	7	13	69	78
6	Mar 19/86	7.2	13.0	SW - W	50	98	69	84
7	Apr 30/86	13.8	15.2	ESE - SSW	7	20	55	70
8	May 28/86	20.8	26.6	WNW - W	6	13	48	72
9	Jun 18/86	15.5	19.8	WNW - W	17	24	40	55
10	Jul 23/86	20.6	27.1	W - SSW	4	9	60	86
11	Aug 27/86	14.5	18.3	WNN - W	24	30	62	76
12	Sep 24/86	15.0	22.0	WSW - W	Calm	17	68	99
13	Nov 05/86	2.2	4.8	ENE - E	17	26	64	69
14	Dec 04/86	-1.8	0.1	WSW - W	32	50	69	90
15	Jan 14/87	3.5	5.7	WSW	24	37	75	82
16	Feb 18/87	-4.0	-8.0	NE - N	13	22	52	57
17	Mar 18/87	2.0	7.0	ENE	17	26	24	40
18	Apr 30/87	4.8	8.0	WNW - NW	28	33	50	66
19	May 21/87	14.5	21.6	S - SSE	9	17	68	84
20	Jun 24/87	23.0	28.0	WSW - WNW	Calm	13	45	70
21	Jul 23/87	27.0	32.0	WSW - WNW	13	20	50	74
22	Aug 20/87	19.7	22.5	W - NW	17	26	49	71
23	Sep 24/87	13.0	15.0	NE - ENE	7	22	60	75
24	Nov 26/87	-1.4	0.4	NNE - ENE	17	24	82	89
25	Jan 27/88	-10.8	-8.0	WNW - WSW	13	20	58	78
26	Feb 23/88	-2.2	-1.2	NW - W	15	24	61	70
27	Mar 17/88	-0.4	1.6	WNW - W	24	30	57	62
28	Apr 27/88	3.0	6.0	ENE	28	46	70	91

Barhole



LEGEND

- ▲ GP1-82 (10', 25') NESTED GAS PROBES AND DEPTH

figure 3.1

GAS WELL & PROBE LOCATIONS
Upper Ottawa Street Landfill Site Study



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

February 5, 1986

Regional Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Attention: Mr. G. Dykeman

Re: Mann Testing File 852879/3439/2
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

The initial sampling for the Region Project was carried out October 30, 1985 with the results being reported December 2, 1985. The second sampling was subsequently conducted November 27, 1985 using the same protocol as that employed for sample 1, i.e. the bag samples were collected from the Bore Hole, Test Well and 2 vent probes; and analysed for major components.

I must apologize for our failure to analyse the bag samples quantitatively for those compounds shown in the "target list", and admit that this omission was due to an oversight on my part. This problem has now been rectified and the correct analytical results will be shown in all future reports.

The Gas Chromatography/Mass Spectrometry (GC/MS) analysis results from the November 27 sampling are shown in Table I. The air samples were again collected from the fixed sites 1, 2 and 3 and correspond to West, Central and East locations. On the day of sampling the wind was from the due north (350° - 12°) at a speed of 5-6 knots. The air temperature was 2 deg. Celsius, and the relative humidity 80 percent.

Bag samples were collected from the Bore Hole, Test Well, vent probe 3 (short) and 4, and as previously stated, were analysed for general composition. The results are shown in Table 2.

TABLE 2

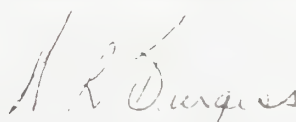
<u>Constituent</u>	<u>Bore Hole</u>	<u>Test Well</u>	<u>VP #3 Short</u>	<u>VP #4</u>
Methane %	69.7	67.6	73.4	75.8
Carbon Dioxide %	25.6	26.6	25.0	22.4
Oxygen %	0.4	0.2	0.4	1.0
Nitrogen %	1.5	0.7	1.5	1.8
*Total Hydrocarbon (non-methane)	241 ppm	265 ppm	405 ppm	311 ppm
Halogenated Hydrocarbons	1.2 ppm	2.9 ppm	0.4 ppm	0.7 ppm

The third sampling of January 14, 1986 will be reported within the next week or two. Projected dates for the final three samplings in your current fiscal year are February 5, February 26 and March 19, 1986 and this should bring the project back on schedule.

Please feel free to contact me if you have any questions related to the reported findings.

Yours truly,

MANN TESTING LABORATORIES LTD.



W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Encl.

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: November 27, 1985

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1	Site #2	Site #3	MDL
	WEST ng/L	CENTRAL ng/L	EAST ng/L	ng/L
1,1-Dichloroethene	ND	BMDL	BMDL	0.3
1,2-Dichloroethene (trans)	0.3	ND	BMDL	0.2
1,1-Dichloroethane	ND	ND	1.5	0.2
1,2-Dichloroethene (cis)	ND	ND	0.8	0.2
Chloroform	0.4	0.2	BMDL	0.2
Tetrahydrofuran	ND	ND	3.0	0.2
1,1,1-Trichloroethane	2.5	ND	ND	0.2
Benzene	3.3	1.2	3.2	0.1
Trichloroethene	ND	ND	BMDL	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	4.6	3.1	36.2	0.1
Tetrachloroethene	0.7	0.5	0.4	0.2
Ethylbenzene	1.6	5.6	36.3	0.1
m & p-Xylene	6.8	14.0	81.2	0.1
o-Xylene	1.6	2.6	34.7	0.1
Benzaldehyde	1.8	3.2	2.5	0.5
1,2,4-Trimethylbenzene	2.0	2.4	12.9	0.2
Phenol	ND	ND	ND	20.0
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	BMDL	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	2.3	2.5	3.9	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

March 3, 1986

Regional Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Attention: Mr. G. Dykeman

Re: Mann Testing File 852879/3650/3

Dear Sir:

The third sampling for the Region Project was carried out January 14, 1986 and, as previously mentioned in our report of February 5, all samples will be analyzed quantitatively, in this and all future reports.

On the day of sampling, the air temperature was -18°C with the wind from the southwest at 20 km per hour. Relative humidity was 66%.

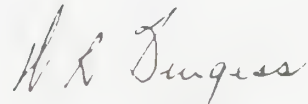
The air samples from sites 1, 2 and 3 were analyzed quantitatively by GC/MS, and the results are presented in Table I. The bag samples were likewise analyzed and quantitated using GC/MS, with the results being shown in Table 2. These latter samples were collected from the Bore Hole, Test Well and Vent Probes #2 (tall) and #3 (short). Two of the goosenecks, #12 and #14 were covered at the open end with small kitchen garbage bags, but they produced less than 0.5 liters volume after one hour.

Sampling #4 was conducted February 5, but the analytical results from the air samples have not yet been finalized.

If you have any questions, I would be pleased to hear from you.

Yours truly,

MANN TESTING LABORATORIES LTD.

A handwritten signature in cursive script, appearing to read "W.R. Burgess".

W.R. Burgess, B.Sc., C.Chem.,
Manager, Occupational Health

WRB/jh,
Encl.

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: January 14, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	0.5	ND	ND	0.2
Benzene	2.0	0.5	1.7	0.1
Trichloroethene	0.3	0.1	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	1.7	1.5	13.5	0.1
Tetrachloroethene	0.1	BMDL	0.2	0.2
Ethylbenzene	0.2	0.7	3.2	0.1
m & p-Xylene	1.3	2.6	10.6	0.1
o-Xylene	0.6	1.3	2.3	0.1
Benzaldehyde	0.6	0.2	0.3	0.5
1,2,4-Trimethylbenzene	0.2	0.3	0.3	0.2
Phenol	ND	ND	ND	20.0
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	0.1	0.1	ND	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Off-Gas Analysis - Bag Samples

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 2 µg/L	Probe 3 µg/L	MDL µg/L
1,1-Dichloroethene	ND	8.66	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	BMDL	1.00
1,1-Dichloroethane	1.27	17.53	3.58	1.21	1.00
1,2-Dichloroethene (cis)	ND	2.24	ND	BMDL	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	26.20	25.27	56.76	1.00
1,1,1-Trichloroethane	ND	6.27	ND	ND	1.00
Benzene	1.02	20.57	10.19	12.81	0.50
Trichloroethene	ND	BMDL	ND	ND	1.00
1,4-Dioxane	ND	6.28	BMDL	7.53	1.00
Toluene	0.67	267.72	95.71	613.53	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	94.05	67.29	133.79	0.50
m & p-Xylene	1.74	223.72	187.98	346.88	0.50
o-Xylene	0.66	77.55	48.15	137.06	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	15.24	1.79	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	BMDL	BMDL	BMDL	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

March 6, 1986

Regional Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Attention: Mr. G. Dykeman

Re: Mann Testing File 852789/3790/04
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Attached is a report of the fourth sampling that was carried out February 5, 1986.

It was discussed during a telephone call to your office on February 7, 1986, that the air samples taken at Site 3 (East) were lost, during analysis, because of an instrument malfunction and subsequent loss of data. The remaining data has been presented in Tables 1 and 2.

In order to compensate for the lost sample, it was proposed and agreed upon, that one additional sampling be conducted during the next fiscal year. This would bring the total number of samplings to 28 over the duration of the contract, with the cost of the replacement sample set being borne by Mann Testing Laboratories.

I trust that this will meet with your approval, and will not cause you any inconvenience.

Yours truly,

MANN TESTING LABORATORIES LTD.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Encl.

DATE: March 5, 1986

FILE NUMBER: 852789/3790/04

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P. O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING: UPPER OTTAWA LANDFILL SITE

DESCRIPTION:

- 1) Collection of 3 air samples from preselected East, West and Central locations for quantitative analysis of 18 target compounds.
- 2) Collection of 4 bag samples from bore hole, test well and test probes for quantitative analysis of 18 target compounds.

REF. NO. : P.O. R59331

SAMPLING DATE: February 5, 1986

SAMPLE NO.: 4 of 27

WIND/WEATHER CONDITIONS:

Wind Direction : NNE
Velocity : 10 Km/Hr
Air Temperature: +1° Celcius
Rel. Humidity : 97 Percent

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: February 26, 1986

W. R. Burgess, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: February 5, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	2.8	2.1	NA	0.3
1,2-Dichloroethene (trans)	ND	ND	NA	0.2
1,1-Dichloroethane	ND	ND	NA	0.2
1,2-Dichloroethene (cis)	ND	ND	NA	0.2
Chloroform	1.1	0.3	NA	0.2
Tetrahydrofuran	ND	1.4	NA	0.2
1,1,1-Trichloroethane	6.4	4.7	NA	0.2
Benzene	12.1	7.7	NA	0.1
Trichloroethene	1.1	0.4	NA	0.2
1,4-Dioxane	ND	ND	NA	2.0
Toluene	12.9	10.3	NA	0.1
Tetrachloroethene	1.2	1.3	NA	0.2
Ethylbenzene	2.3	5.2	NA	0.1
m & p-Xylene	7.3	11.0	NA	0.1
o-Xylene	4.2	3.3	NA	0.1
Benzaldehyde	4.7	3.6	NA	0.5
1,2,4-Trimethylbenzene	1.5	0.3	NA	0.2
Phenol	ND	ND	NA	20.0
1,3-Dichlorobenzene	ND	ND	NA	0.3
1,4-Dichlorobenzene	0.4	BMDL	NA	0.3
1,2-Dichlorobenzene	ND	ND	NA	0.3
Naphthalene	2.5	19.7	NA	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

NA - Data Not Available

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 7 µg/L	Probe 3 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	2.07	BMDL	1.08	1.00
1,1-Dichloroethane	2.14	12.63	1.00	1.34	1.00
1,2-Dichloroethene (cis)	1.13	BMDL	BMDL	BMDL	1.00
Chloroform	1.37	6.76	BMDL	BMDL	1.00
Tetrahydrofuran	ND	26.61	ND	45.68	1.00
1,1,1-Trichloroethane	BMDL	5.96	BMDL	BMDL	1.00
Benzene	2.13	20.33	14.57	16.91	0.50
Trichloroethene	1.14	BMDL	1.76	BMDL	1.00
1,4-Dioxane	ND	3.17	ND	ND	1.00
Toluene	5.23	193.31	29.76	499.76	0.50
Tetrachloroethene	BMDL	BMDL	BMDL	BMDL	1.00
Ethylbenzene	1.83	113.08	53.19	130.41	0.50
m & p-Xylene	4.47	256.47	96.26	338.52	0.50
o-Xylene	2.13	55.37	21.25	112.70	0.50
Benzaldehyde	BMDL	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	2.04	28.67	5.88	29.97	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	2.50	BMDL	BMDL	BMDL	1.50
1,4-Dichlorobenzene	1.93	BMDL	BMDL	BMDL	1.50
1,2-Dichlorobenzene	NA	NA	NA	NA	1.50
Naphthalene	3.19	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

March 20, 1986

Mr. G. Dykeman
Regional Municipality of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Dear Sir:

RE: Mann Testing File# 852879/4015/05
Environmental Monitoring
-----Upper Ottawa Landfill Site-----

Please find attached the analytical findings from sampling number five (5) that was conducted on February 26, 1986. As with previous sample collection, bag samples were collected at the Test Well, Bore Hole, and the two vent probes that were considered to be the most active.

As requested in our telephone conversation of March 19, 1986, copies of all future reports will be sent to Anne Koven, for examination and retention.

Yours truly,

MANN TESTING LABORATORIES LTD.

W.R. Burgess, B.Sc.
Manager, Occupational Health

DATE: March 17, 1986

FILE NUMBER: 852879/4015/05

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from preselected East, West and Central locations for quantitative analysis of 18 target compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: February 26, 1986

SAMPLE NO.: 5 of 27

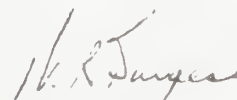
WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	SSE	SE	SE	ESE	E
Velocity : Km/Hr	9	9	7	13	13
Air Temperature: ° Celcius	-10.3	-9.3	-7.9	-7.6	-7.9
Rel. Humidity : Percent	78	75	70	69	75

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: March 18, 1986



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: February 26, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL - ng/L
1,1-Dichloroethene	0.7	1.9	1.3	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	1.1	ND	0.2
Chloroform	ND	0.2	0.4	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	3.9	11.5	6.8	0.2
Benzene	3.8	3.7	5.8	0.1
Trichloroethene	0.7	1.2	1.3	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	4.7	10.6	9.6	0.1
Tetrachloroethene	0.5	0.8	0.8	0.2
Ethylbenzene	2.8	5.4	3.9	0.1
m & p-Xylene	7.3	11.7	9.1	0.1
o-Xylene	1.9	2.6	2.9	0.1
Benzaldehyde	3.2	3.1	3.7	0.5
1,2,4-Trimethylbenzene	2.3	1.7	2.4	0.2
Phenol	1.5	1.2	1.6	1.0
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	1.3	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: Feb. 26, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 4 µg/L	Probe 3 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	ND	14.40	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	ND	35.71	45.68	1.00
1,1,1-Trichloroethane	ND	2.50	ND	ND	1.00
Benzene	1.98	17.62	11.70	12.24	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	ND	64.24	12.34	218.98	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	ND	107.97	63.26	105.04	0.50
m & p-Xylene	ND	225.39	150.50	223.51	0.50
o-Xylene	ND	74.75	33.82	104.60	0.50
Benzaldehyde	BMDL	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	26.31	6.61	19.00	1.00
Phenol	3.60	8.01	3.44	2.84	2.50
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	BMDL	ND	BMDL	1.50
1,2-Dichlorobenzene	NA	NA	NA	NA	1.50
Naphthalene	ND	1.58	BMDL	BMDL	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

April 4, 1986

Mr. G. Dykeman
Regional Municipality of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Re: Mann Testing Fill 852879/4214/6
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Please find attached the analytical data from sampling number six (6), that was conducted on March 13, 1986.

The wind velocity recorded in the data sheet includes the gusting velocities recorded each hour from 10:00 A.M. to 2:00 P.M.

Yours truly,

MANN TESTING LABORATORIES

W.R. Burgess, B.Sc.
Manager, Occupational Health

WRB/vs
Encl:

cc: Ms Anne Koven

DATE: April 4, 1986

FILE NUMBER: 852879/4214/6

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: March 19, 1986

SAMPLE NO.: 6 of 27

WIND/WEATHER CONDITIONS:

		10AM	11AM	12PM	1PM	2PM
Wind Direction :		SW	SW	SW	SW	W
Velocity :	Km/Hr	55-75	68-98	55-75	50-70	55-72
Air Temperature:	° Celcius	12.9	13.0	10.9	9.7	7.2
Rel. Humidity :	Percent	82	69	75	81	84

RESULTS: Air Samples - Sorbent Tubes Table 1
 Bag Samples Table 2

NEXT SAMPLING DATE: April 30, 1986

W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air analysis - Sorbent Tube Method
Sampling Date: MARCH 19, 1986

SAMPLING DATE MARCH 19 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	- MDL ng/L
1,1-Dichloroethene	1.2	ND	1.5	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	0.6	ND	ND	0.2
Benzene	4.4	1.5	3.3	0.1
Trichloroethene	0.6	BMDL	0.3	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	1.9	0.3	11.2	0.1
Tetrachloroethene	0.2	BMDL	BMDL	0.2
Ethylbenzene	0.1	BMDL	3.6	0.1
m & p-Xylene	0.6	0.2	10.8	0.1
o-Xylene	0.3	BMDL	3.1	0.1
Benzaldehyde	1.5	0.6	1.0	0.5
1,2,4-Trimethylbenzene	0.2	BMDL	0.6	0.2
Phenol	BMDL	BMDL	BMDL	1.0
1,3-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: March 19, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 2 µg/L	Probe 3 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	BMDL	ND	ND	ND	1.00
1,1-Dichloroethane	2.25	17.16	5.39	3.16	1.00
1,2-Dichloroethene (cis)	BMDL	4.02	ND	2.55	1.00
Chloroform	3.15	ND	ND	ND	1.00
Tetrahydrofuran	3.20	ND	22.66	46.63	1.00
1,1,1-Trichloroethane	BMDL	9.48	BMDL	BMDL	1.00
Benzene	1.68	15.51	14.13	12.78	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	5.48	90.32	57.66	191.68	0.50
Tetrachloroethene	BMDL	ND	ND	ND	1.00
Ethylbenzene	1.06	103.25	78.62	93.46	0.50
m & p-Xylene	2.37	222.66	181.16	237.81	0.50
o-Xylene	0.79	66.32	53.26	100.86	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	5.80	13.77	16.45	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	BMDL	ND	1.50
1,2-Dichlorobenzene	NA	NA	NA	NA	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

June 2, 1986

Mr. G. Dykeman
Regional Municipality of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Re: Mann Testing File 852879/4527/7
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Please find attached the analytical data from sampling number seven (7), that was conducted on April 30, 1986.

Yours truly,

MANN TESTING LABORATORIES LTD.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Encl.

DATE: June 2, 1986

FILE NUMBER: 852879/4527/7

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: April 30, 1986

SAMPLE NO.: 7 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	ESE	SE	SE	S	SSW
Velocity : Km/Hr	7	13	20	20	20
Air Temperature: ° Celcius	13.8	15.1	15.2	14.1	14.4
Rel. Humidity : Percent	70	59	55	55	56

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: May 28, 1986



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: April 30, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 2 µg/L	Probe 3 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	ND	9.92	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	BMDL	ND	ND	ND	1.00
Tetrahydrofuran	ND	14.98	32.58	26.18	1.00
1,1,1-Trichloroethane	ND	4.16	ND	ND	1.00
Benzene	BMDL	14.06	10.63	32.37	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	ND	143.96	432.58	294.38	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	ND	158.29	163.30	188.38	0.50
m & p-Xylene	ND	392.11	473.13	504.89	0.50
o-Xylene	ND	90.87	116.73	129.13	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	50.37	41.77	55.62	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	NA	NA	NA	NA	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: APRIL 30, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	BMDL	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	BMDL	BMDL	BMDL	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	BMDL	BMDL	BMDL	0.2
Benzene	0.8	0.5	0.5	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	1.4	1.5	1.2	0.1
Tetrachloroethene	BMDL	BMDL	BMDL	0.2
Ethylbenzene	1.1	1.7	0.9	0.1
m & p-Xylene	2.2	4.0	2.1	0.1
o-Xylene	0.7	1.4	0.7	0.1
Benzaldehyde	1.7	3.0	2.5	0.5
1,2,4-Trimethylbenzene	0.6	0.9	0.4	0.2
Phenol	3.0	2.8	1.6	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

DATE: July 4, 1986

FILE NUMBER: 864667/9

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

- DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: May 28, 1986

SAMPLE NO.: 8 of 27

WIND/WEATHER CONDITIONS:

		10AM	11AM	12PM	1PM	2PM
Wind Direction :		WNW	W	W	W	WNW
Velocity :	Km/Hr	9	9	13	13	6
Air Temperature:	° Celcius	20.8	22.5	23.8	25	26.6
Rel. Humidity :	Percent	72	67	63	55	48

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1

Table 2

NEXT SAMPLING DATE: June 18, 1986



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: MAY 28, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	BMDL	BMDL	BMDL	0.3
1,2-Dichloroethene (trans)	BMDL	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	BMDL	0.2	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	0.5	BMDL	0.9	0.2
Benzene	BMDL	BMDL	15.5	0.1
Trichloroethene	BMDL	BMDL	BMDL	0.2
1,4-Dioxane	BMDL	BMDL	BMDL	2.0
Toluene	48.8	2.3	178.7	0.1
Tetrachloroethene	0.3	BMDL	0.6	0.2
Ethylbenzene	0.1	0.1	6.4	0.1
m & p-Xylene	1.7	0.1	11.0	0.1
o-Xylene	0.8	0.1	5.4	0.1
Benzaldehyde	4.4	0.7	9.0	0.5
1,2,4-Trimethylbenzene	0.3	BMDL	1.1	0.2
Phenol	ND	ND	ND	20.0
1,3-Dichlorobenzene	ND	BMDL	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	0.5	0.3
1,2-Dichlorobenzene	ND	ND	BMDL	0.3
Naphthalene	0.2	BMDL	BMDL	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: May 28, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 2 µg/L	Probe 7 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	ND	14.53	4.63	BMDL	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	27.22	27.51	11.62	1.00
1,1,1-Trichloroethane	ND	4.90	ND	ND	1.00
Benzene	1.25	22.27	18.53	22.77	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	3.88	ND	ND	1.00
Toluene	BMDL	174.51	203.22	94.43	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	165.80	140.78	134.96	0.50
m & p-Xylene	BMDL	337.18	343.78	211.97	0.50
o-Xylene	BMDL	89.43	83.73	69.01	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	60.63	26.55	31.35	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	BMDL	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	0.75	0.67	BMDL	BMDL	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

DATE: July 4, 1986

FILE NUMBER: 864764/9

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: June 18, 1986

SAMPLE NO.: 9 of 27

WIND/WEATHER CONDITIONS:

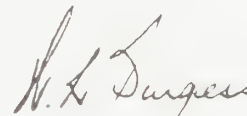
	10AM	11AM	12PM	1PM	2PM
Wind Direction :	WNW	WNW	W	W	WNW
Velocity : Km/Hr	17	17	20	19-37*	24-35*
Air Temperature: ° Celcius	15.5	16.6	18	18.9	19.8
Rel. Humidity : Percent	55	55	49	47	40

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: July 23, 1986

*Gust Velocity



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: June 18, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	BMDL	ND	BMDL	0.2
Chloroform	BMDL	ND	0.2	0.2
Tetrahydrofuran	ND	ND	0.3	0.2
1,1,1-Trichloroethane	ND	0.4	0.4	0.2
Benzene	0.9	0.4	0.9	0.1
Trichloroethene	BMDL	BMDL	ND	0.2
1,4-Dioxane	ND	ND	BMDL	2.0
Toluene	4.0	1.3	9.2	0.1
Tetrachloroethene	0.2	0.2	BMDL	0.2
Ethylbenzene	1.1	0.8	5.4	0.1
m & p-Xylene	2.7	1.4	14.5	0.1
o-Xylene	1.0	0.3	4.3	0.1
Benzaldehyde	4.2	4.9	4.5	0.5
1,2,4-Trimethylbenzene	0.5	0.3	1.0	0.2
Phenol	ND	ND	ND	20.0
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

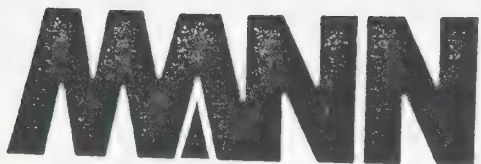
UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: June 18, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3T µg/L	Probe 3S µg/L	MDL µg/L
1,1-Dichloroethene	2.54	1.85	ND	ND	1.50
1,2-Dichloroethene (trans)	2.73	3.79	1.82	1.78	1.00
1,1-Dichloroethane	3.11	14.39	3.72	2.41	1.00
1,2-Dichloroethene (cis)	1.76	2.27	ND	ND	1.00
Chloroform	2.32	3.12	1.80	ND	1.00
Tetrahydrofuran	ND	23.71	36.64	59.02	1.00
1,1,1-Trichloroethane	2.42	6.88	1.96	1.00	1.00
Benzene	2.84	15.57	18.74	14.17	0.50
Trichloroethene	1.87	ND	ND	BMDL	1.00
1,4-Dioxane	ND	ND	ND	11.17	1.00
Toluene	1.43	98.31	8.95	345.19	0.50
Tetrachloroethene	1.64	2.15	1.38	BMDL	1.00
Ethylbenzene	ND	33.94	27.65	50.81	0.50
m & p-Xylene	1.16	72.06	46.80	116.64	0.50
o-Xylene	ND	17.20	2.27	26.68	0.50
Benzaldehyde	BMDL	11.53	ND	ND	2.50
1,2,4-Trimethylbenzene	1.01	4.80	ND	5.88	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	1.61	BMDL	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	0.90	BMDL	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

August 20, 1986

Mr. G. Dykeman
Regional Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

RE: Mann Testing File #864939/10
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir

~~Attached, please find the analytical data from sampling~~
number ten (10) that was conducted July 23, 1986.

Yours truly

MANN TESTING LABORATORIES LTD.

W.R. Burgess, B.Sc., C. Chem.
Manager, Occupational Health

WRB/vs

Encl.

cc: Ms Anne Koven

DATE: August 18, 1986

FILE NUMBER: 864939/10

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: July 23, 1986

SAMPLE NO.: 10 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	W	WSW	WSW	SW	SSW
Velocity : Km/Hr	4	6	CALM	6	9
Air Temperature: ° Celcius	22.3	24.4	25.9	26.7	27.1
Rel. Humidity : Percent	78	70	66	60	60

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: August 27, 1986



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: JULY 23, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1	Site #2	Site #3	MDL
	WEST ng/L	CENTRAL ng/L	EAST ng/L	ng/L
1,1-Dichloroethene	BMOL	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	BMOL	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	BMOL	BMOL	0.9	0.2
Tetrahydrofuran	BMOL	ND	ND	0.2
1,1,1-Trichloroethane	1.1	0.9	1.0	0.2
Benzene	2.3	1.8	2.0	0.1
Trichloroethene	BMOL	BMOL	BMOL	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	4.0	2.7	7.6	0.1
Tetrachloroethene	0.3	BMOL	0.3	0.2
Ethylbenzene	1.0	1.1	5.0	0.1
m & p-Xylene	4.8	3.3	19.2	0.1
o-Xylene	1.1	1.0	5.0	0.1
Benzaldehyde	6.7	8.5	6.1	0.5
1,2,4-Trimethylbenzene	1.1	0.5	1.3	0.2
Phenol	ND	ND	ND	20.0
1,3-Dichlorobenzene	BMOL	ND	BMOL	0.3
1,4-Dichlorobenzene	ND	ND	BMOL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	1.1	0.8	0.6	0.5

MDL - Method Detection Limit

BMOL - Detected Below MDL

ND - None Detected

TABLE 2

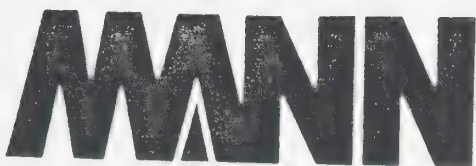
UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: July 23, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 6T µg/L	Probe 4 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	ND	10.44	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	39.13	56.21	52.73	1.00
1,1,1-Trichloroethane	ND	3.75	ND	ND	1.00
Benzene	2.96	29.73	23.20	22.82	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	2.76	203.35	121.01	37.37	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	1.57	62.36	45.99	86.59	0.50
m & p-Xylene	5.17	108.52	105.10	163.74	0.50
o-Xylene	1.44	24.91	16.31	20.37	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	ND	ND	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	2.21	1.13	1.93	3.10	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

October 3, 1986

Mr. G. Dykeman
Region Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Re: Mann Testing File 865140/11
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Attached please find the analytical data report from sampling number eleven (11) that was carried out August 27, 1986.

Yours truly,

MANN TESTING LABORATORIES LTD.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.

DATE: September 23, 1986

FILE NUMBER: 865140/11

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: August 27, 1986

SAMPLE NO.: 11 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	WNW	WNW	WNW	WNW	W
Velocity : Km/Hr	26	24-40	30	28-35	26
Air Temperature: ° Celcius	15.4	15.7	18.3	17.2	17
Rel. Humidity : Percent	74	74	64	66	62

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: September 24, 1986



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: AUG/ST 27 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	1.2	EMDL	ND	0.2
1,2-Dichloroethene (cis)	2.0	ND	0.4	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	5.5	ND	ND	0.2
Benzene	3.7	0.4	4.2	0.1
Trichloroethene	EMDL	ND	0.8	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	6.7	EMDL	7.2	0.1
Tetrachloroethene	0.4	0.1	0.4	0.2
Ethylbenzene	1.7	0.2	2.6	0.1
m & p-Xylene	3.9	0.2	5.3	0.1
o-Xylene	1.7	0.2	2.2	0.1
Benzaldehyde	5.4	2.0	EMDL	0.5
1,2,4-Trimethylbenzene	0.8	EMDL	1.2	0.2
Phenol	ND	ND	EMDL	0.5
1,3-Dichlorobenzene	EMDL	ND	EMDL	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	EMDL	ND	ND	0.3
Naphthalene	EMDL	EMDL	EMDL	0.5

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: August 27, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 2T µg/L	Probe 6S µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	BMDL	ND	ND	ND	1.00
1,1-Dichloroethane	2.55	1.52	BMDL	BMDL	1.00
1,2-Dichloroethene (cis)	ND	BMDL	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	22.18	11.69	31.54	1.00
1,1,1-Trichloroethane	ND	BMDL	ND	ND	1.00
Benzene	2.67	12.37	7.92	8.14	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	2.48	ND	5.32	1.00
Toluene	2.33	65.30	32.25	34.93	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	1.18	35.30	17.04	27.28	0.50
m & p-Xylene	2.55	59.82	35.99	62.44	0.50
o-Xylene	0.90	12.11	6.85	9.20	0.50
Benzaldehyde	2.45	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	BMDL	1.74	ND	1.35	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	1.91	ND	0.86	0.59	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

October 24, 1986

Mr. G. Dykeman
Region Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Re: Mann Testing File 865307
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Attached, please find the analytical data report from sampling number twelve (12), that was carried out on September 24, 1986.

Yours truly,

MANN TESTING LABORATORIES LTD.

A handwritten signature in dark ink, appearing to read "W.R. Burgess". The signature is fluid and cursive.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.

cc - Ms. Anne Koven

DATE: October 24, 1986

FILE NUMBER: 865307

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-442
TELEPHONE:

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: September 24, 1986

SAMPLE NO.: 12 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	WSW	SW	WSW	WSW	W
Velocity : Km/Hr	9	11	15	17	17
Air Temperature: ° Celcius	17	17	17	20	22
Rel. Humidity : Percent	92	94	94	80	68

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: November 5, 1986



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: September 24, 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	0.8	ND	ND	0.2
1,1-Dichloroethane	BMDL	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	BMDL	BMDL	0.2
Tetrahydrofuran	ND	0.3	ND	0.2
1,1,1-Trichloroethane	ND	ND	BMDL	0.2
Benzene	0.2	2.9	0.7	0.1
Trichloroethene	ND	ND	BMDL	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	7.7	3.9	8.9	0.1
Tetrachloroethene	1.0	0.6	0.9	0.2
Ethylbenzene	2.0	3.6	9.4	0.1
m & p-Xylene	4.1	7.4	29.7	0.1
o-Xylene	2.7	4.7	12.5	0.1
Benzaldehyde	3.7	3.7	5.9	0.5
1,2,4-Trimethylbenzene	7.6	4.8	6.9	0.2
Phenol	ND	ND	ND	20.0
1,3-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,4-Dichlorobenzene	0.3	0.5	0.7	0.3
1,2-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
Naphthalene	0.7	0.7	0.6	0.5

MDL Method Detection Limit
 BMDL - Detected Below MDL
 ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: September 24, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 6S µg/L	Probe 7 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	BMDL	2.05	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	1.30	ND	ND	1.00
Chloroform	BMDL	ND	ND	ND	1.00
Tetrahydrofuran	ND	23.88	33.41	8.81	1.00
1,1,1-Trichloroethane	ND	BMDL	ND	ND	1.00
Benzene	0.82	17.39	6.12	11.99	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	5.63	8.62	ND	1.00
Toluene	0.70	149.72	26.82	21.39	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	78.25	37.97	47.38	0.50
m & p-Xylene	1.32	127.40	88.43	43.23	0.50
o-Xylene	BMDL	27.96	12.18	7.33	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	BMDL	7.50	3.76	1.11	1.00
Phenol	NA	NA	NA	NA	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	ND	ND	BMDL	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	0.63	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
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PHONE: 890-2555 • TELEX: 06-960496

December 11, 1986

Mr. G. Dykeman
Region Municipality of
Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Re: Mann Testing File 865667
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Attached, please find the analytical data report from sampling number 12, that was carried out on November 5, 1986.

Yours truly,

MANN TESTING LABORATORIES LTD.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.

DATE: December 11, 1986

FILE NUMBER: 865667

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: November 5, 1986

SAMPLE NO.: 13 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	ENE	NE	ENE	ENE	E
Velocity : Km/Hr	26	22	17	20	19
Air Temperature: ° Celcius	2.2	2.3	3.7	4.2	4.8
Rel. Humidity : Percent	69	67	67	65	64

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: December 4, 1986


W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: NOVEMBER 05 , 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	0.7	ND	ND	0.3
1,2-Dichloroethene (trans)	0.2	ND	ND	0.2
1,1-Dichloroethane	0.2	0.3	ND	0.2
1,2-Dichloroethene (cis)	BMDL	BMDL	1.2	0.2
Chloroform	0.3	0.4	0.3	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	2.8	3.9	0.6	0.2
Benzene	3.0	3.3	3.6	0.1
Trichloroethene	0.6	0.4	ND	0.2
1,4-Dioxane	BMDL	ND	ND	2.0
Toluene	4.1	5.4	1.7	0.1
Tetrachloroethene	0.9	1.2	0.9	0.2
Ethylbenzene	1.0	2.4	0.9	0.1
m & p-Xylene	4.6	6.4	1.5	0.1
o-Xylene	1.0	1.3	0.6	0.1
Benzaldehyde	2.5	4.9	0.4	0.5
1,2,4-Trimethylbenzene	0.9	1.5	0.4	0.2
Phenol	1.8	1.6	ND	0.5
1,3-Dichlorobenzene	BMDL	BMDL	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	ND	0.3
1,2-Dichlorobenzene	BMDL	BMDL	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: November 5, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3S µg/L	Probe 6T µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	1.13	ND	2.54	ND	1.00
1,1-Dichloroethane	7.34	18.13	4.18	1.20	1.00
1,2-Dichloroethene (cis)	ND	6.63	ND	ND	1.00
Chloroform	ND	1.22	ND	ND	1.00
Tetrahydrofuran	19.70	52.86	113.27	67.51	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	4.63	30.21	32.40	16.36	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	8.16	16.52	ND	1.00
Toluene	4.60	291.72	403.09	9.12	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	3.80	130.97	196.61	55.56	0.50
m & p-Xylene	2.53	205.68	271.71	101.63	0.50
o-Xylene	1.92	46.27	43.35	7.45	0.50
Benzaldehyde	ND	3.01	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	11.98	7.69	3.28	1.00
Phenol	13.56	ND	ND	ND	10.00
1,3-Dichlorobenzene	2.42	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	BMDL	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

January 7, 1987

Mr. G. Dykeman
The Regional Municipality
of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

Re: Mann Testing File 865667
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Attached, please find the analytical data report
from sampling number 12, that was carried out on
December 4, 1986.

Yours, truly,

A handwritten signature in dark ink, appearing to read "W.R. Burgess". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

W.R. Burgess, B.Sc.

DATE: January 7, 1987

FILE NUMBER: 865922/14

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TÉLEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: December 4, 1986

SAMPLE NO.: 14 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	WSW	WSW	WSW	WSW	W
Velocity : Km/Hr	43	39	50	46	32
Air Temperature: ° Celcius	-1.1	-0.5	-0.1	0.1	-1.8
Rel. Humidity : Percent	77	78	74	69	90

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: January 14, 1987


W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE 1

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: DECEMBER 04 1986

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	BMDL	0.8	0.3
1,2-Dichloroethene (trans)	ND	3.8	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	1.7	ND	ND	0.2
Chloroform	ND	0.8	ND	0.2
Tetrahydrofuran	BMDL	ND	ND	0.2
1,1,1-Trichloroethane	1.7	2.3	3.8	0.2
Benzene	1.1	1.5	1.5	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	1.6	2.1	4.8	0.1
Tetrachloroethene	0.3	0.3	0.3	0.2
Ethylbenzene	2.2	9.5	9.1	0.1
m & p-Xylene	0.6	2.5	8.0	0.1
o-Xylene	0.3	0.7	0.3	0.1
Benzaldehyde	BMDL	1.4	2.3	0.5
1,2,4-Trimethylbenzene	1.5	0.9	1.4	0.2
Phenol	ND	BMDL	BMDL	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: December 4, 1986

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3S µg/L	Probe 6S µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	BMDL	ND	1.00
1,1-Dichloroethane	BMDL	6.93	1.36	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	BMDL	ND	1.00
Chloroform	BMDL	ND	ND	1.27	1.00
Tetrahydrofuran	8.61	19.78	30.28	17.54	1.00
1,1,1-Trichloroethane	ND	2.61	ND	ND	1.00
Benzene	0.93	9.48	11.67	3.66	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	BMDL	BMDL	1.37	1.65	1.00
Toluene	0.98	48.41	93.77	8.04	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	1.46	53.94	83.27	22.10	0.50
m & p-Xylene	2.11	101.11	171.62	46.45	0.50
o-Xylene	1.62	23.51	30.92	3.77	0.50
Benzaldehyde	BMDL	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	7.11	6.27	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

January 30, 1987

Mr. G. Dykeman
The Regional Municipality
of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

RE: MANN TESTING FILE #876194
ENVIRONMENTAL MONITORING
UPPER OTTAWA LANDFILL SITE

Dear Sir:

Attached, please find the analytical data report from
sampling number 15, that was carried out on January 14, 1987.

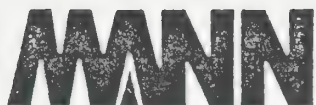
Yours truly,

MANN TESTING LABORATORIES LTD.

A handwritten signature in dark ink, appearing to read "W.R. Burgess".

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

I N V O I C E

TO: REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

INVOICE NO.: 5803
INVOICE DATE: Jan. 31, 1987

CUSTOMER NO.: P.O.# R59331

ATTN: Mr. G. Dykeman

TERMS: Net 30 days

PROFESSIONAL ANALYTICAL SERVICES RENDERED

Environmental Analysis - Upper Ottawa Landfill Site

Sampling for Period: December '86 - February '87

5 samples each comprised of: 3 sorbent tubes,

4 bag samples for GC/MS quantitative
analysis of 18 target compounds \$2235.00

= 5 @ \$2235.00

TOTAL AMOUNT OF THIS INVOICE \$13,410.00

DATE: January 30, 1987

FILE NUMBER: 876194

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

- DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: January 14, 1987

SAMPLE NO.: 15 of 27

WIND/WEATHER CONDITIONS:

		10AM	11AM	12PM	1PM	2PM
Wind Direction :		WSW	WSW	WSW	WSW	WSW
Velocity :	Km/Hr	37-42	33	30	24	28
Air Temperature:	° Celcius	3.5	4.3	4.6	5.7	5.1
Rel. Humidity :	Percent	82	77	78	75	77

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: February 14, 1987

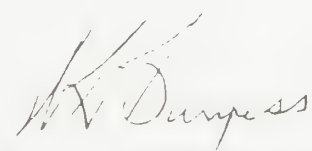

W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: JANUARY 14 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL - ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	0.3	1.4	1.5	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	0.5	0.4	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	0.4	0.4	0.5	0.2
Benzene	BMOL	4.1	5.7	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	0.7	1.2	2.6	0.1
Tetrachloroethene	ND	ND	ND	0.2
Ethylbenzene	0.1	0.4	0.8	0.1
m & p-Xylene	BMOL	0.4	1.5	0.1
o-Xylene	0.1	0.3	0.7	0.1
Benzaldehyde	0.6	BMOL	BMOL	0.5
1,2,4-Trimethylbenzene	BMOL	BMOL	BMOL	0.2
Phenol	ND	ND	ND	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMOL	BMOL	BMOL	0.5

ND - None Detected

MDL - Method Detection Limit

BMOL - Below Method Detection Limit

TABLE 2

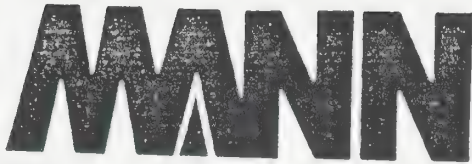
UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: January 14, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 4 µg/L	Probe 7 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	BMDL	ND	ND	ND	1.00
1,1-Dichloroethane	1.27	3.84	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	12.33	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	ND	2.49	ND	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	1.24	2.63	12.40	4.96	0.50
Trichloroethene	ND	4.99	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	1.31	71.02	34.76	0.98	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	1.15	13.57	89.14	16.49	0.50
m & p-Xylene	1.88	27.55	180.04	9.46	0.50
o-Xylene	1.12	8.12	25.02	0.86	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	5.49	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

March 27, 1987

Mr. G. Dykeman
The Region Municipality
of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

RE: Mann Testing File #876694
Environmental Monitoring
Upper Ottawa Landfill Site

Dear Sir:

Attached, please find the analytical data report from sampling number 16 that was carried out on February 18, 1987. The chlorinated species 1,2-Dichloroethene (trans) and 1,2-Dichloroethene (CIS) are viewed with suspicion as possible lab or system contaminants, since there was a delay in the analyses due to Mass Spec breakdown. Additionally, Chloroform and 1,1,1-Trichloroethane appeared to be at higher levels than those normally seen.

Yours truly,

MANN TESTING LABORATORIES LTD.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.

DATE: March 27, 1987

FILE NUMBER: 876694

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: February 18, 1987

SAMPLE NO.: 16 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	NE	NE	N	NE	N
Velocity : Km/Hr	22	20	19	17	13
Air Temperature: ° Celcius	-8	-7	-5	-5	-4
Rel. Humidity : Percent	57	56	57	52	52

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: March 18, 1987


W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: FEBUARY 18 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1	Site #2	Site #3	MDL
	WEST ng/L	CENTRAL ng/L	EAST ng/L	ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	11.3	ND	8.6	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	9.5	ND	0.2
Chloroform	ND	12.4	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	ND	41.9	39.6	0.2
Benzene	6.1	7.5	6.2	0.1
Trichloroethene	0.8	0.7	0.8	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	5.0	5.6	40.4	0.1
Tetrachloroethene	2.6	2.5	1.3	0.2
Ethylbenzene	3.2	1.4	3.5	0.1
m & p-Xylene	4.1	5.0	3.7	0.1
o-Xylene	10.8	4.7	3.5	0.1
Benzaldehyde	13.7	17.4	14.1	0.5
1,2,4-Trimethylbenzene	7.8	8.5	4.9	0.2
Phenol	3.8	5.3	3.4	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	0.3	0.8	0.4	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	0.6	7.3	8.8	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: February 18, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3T µg/L	Probe 7 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	ND	ND	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	14.38	11.97	ND	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	1.35	14.45	12.98	5.65	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	1.64	18.71	13.82	1.62	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	57.41	83.26	25.88	0.50
m & p-Xylene	BMDL	94.25	192.61	29.17	0.50
o-Xylene	BMDL	13.40	20.98	2.72	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	5.72	5.72	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

April 13, 1987

Mr. G. Dykeman
The Region Municipality
of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

RE: MANN TESTING FILE 876759
ENVIRONMENTAL MONITORING
UPPER OTTAWA LANDFILL SITE

Dear Sir:

Attached, please find the analytical data report from sampling number 17, that was carried out on March 18, 1987.

Yours truly,

MANN TESTING LABORATORIES LTD.

A handwritten signature in dark ink, appearing to read "W.R. Burgess". The signature is fluid and cursive.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.

DATE: April 10, 1987

FILE NUMBER: 876759

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

- DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: March 18, 1987

SAMPLE NO.: 17 of 27

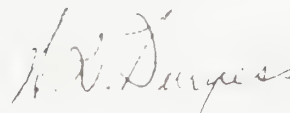
WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	ENE	ENE	ENE	ENE	ENE
Velocity : Km/Hr	26	22	17	20	17
Air Temperature: ° Celcius	2	3	4	6	7
Rel. Humidity : Percent	35	40	36	28	24

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: April 29, 1987



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: MARCH 18 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	ND	0.6	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	5.6	2.2	4.0	0.2
Benzene	1.8	1.2	2.5	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	6.6	1.2	2.9	0.1
Tetrachloroethene	0.3	ND	ND	0.2
Ethylbenzene	1.6	0.7	5.4	0.1
m & p-Xylene	4.9	2.6	7.7	0.1
o-Xylene	1.8	0.7	2.3	0.1
Benzaldehyde	5.6	4.9	6.1	0.5
1,2,4-Trimethylbenzene	1.2	0.5	1.1	0.2
Phenol	ND	ND	ND	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	ND	BMDL	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: March 18, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3S µg/L	Probe 6T µg/L	MDL µg/L
1,1-Dichloroethene	ND	BMDL	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	BMDL	ND	ND	1.00
1,1-Dichloroethane	1.19	4.78	BMDL	BMDL	1.00
1,2-Dichloroethene (cis)	ND	BMDL	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	ND	19.93	8.41	1.00
1,1,1-Trichloroethane	ND	5.92	ND	ND	1.00
Benzene	1.11	4.48	5.45	15.43	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	5.55	1.32	1.00
Toluene	0.92	3.46	63.27	11.64	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	4.34	44.98	61.73	0.50
m & p-Xylene	0.64	8.35	101.54	132.54	0.50
o-Xylene	ND	3.14	21.25	18.16	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	2.12	6.65	7.79	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	1.52	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
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PHONE: 890-2555 • TELEX: 06-960496

June 19, 1987

Mr. G. Dykeman
The Region Municipality
of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

RE: MANN TESTING FILE 877113 A & B
ENVIRONMENTAL MONITORING
UPPER OTTAWA LANDFILL SITE

Dear Sir:

Attached, please find the analytical data reports from sampling numbers 18 and 19, that were carried out on April 30, and May 21, 1987 respectively.

Yours truly,

MANN TESTING LABORATORIES LTD.

A handwritten signature in ink, appearing to read "W.R. Burgess". The signature is written in a cursive, slightly slanted style.

W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.

DATE: June 19, 1987

FILE NUMBER: 877113A

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: April 30, 1987

SAMPLE NO.: 18 of 27

WIND/WEATHER CONDITIONS:

		10AM	11AM	12PM	1PM	2PM
Wind Direction :		WNW	WNW	NW	WNW	NW
Velocity :	Km/Hr	28	30	30	32	33
Air Temperature:	° Celcius	4.8	5.9	6.1	7.2	8.0
Rel. Humidity :	Percent	66	57	60	57	50

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1

Table 2

NEXT SAMPLING DATE: May 21, 1987

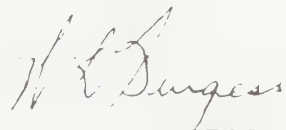

W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air analysis - Sorbent Tube Method
Sampling Date: APRIL 30 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	0.6	0.4	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	5.5	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	2.0	8.8	5.0	0.2
Benzene	0.3	1.2	1.3	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	0.3	1.3	1.7	0.1
Tetrachloroethene	ND	0.2	BMDL	0.2
Ethylbenzene	0.1	0.2	1.7	0.1
m & p-Xylene	0.2	0.6	4.4	0.1
o-Xylene	0.1	0.3	1.2	0.1
Benzaldehyde	1.5	6.6	3.8	0.5
1,2,4-Trimethylbenzene	0.2	0.6	1.4	0.2
Phenol	ND	ND	ND	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	ND	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: April 30, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3T µg/L	Probe 7 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	BMDL	7.53	BMDL	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	14.68	26.36	5.98	1.00
1,1,1-Trichloroethane	ND	3.03	ND	ND	1.00
Benzene	ND	11.29	9.36	7.33	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	6.92	ND	1.00
Toluene	BMDL	12.52	91.63	0.66	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	15.52	57.31	21.74	0.50
m & p-Xylene	BMDL	21.37	119.38	4.89	0.50
o-Xylene	BMDL	3.14	25.54	0.64	0.50
Benzaldehyde	BMDL	BMDL	4.35	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	4.92	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	ND	ND	BMDL	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	3.06	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: April 30, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3T µg/L	Probe 7 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	BMDL	7.53	BMDL	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	14.68	26.36	5.98	1.00
1,1,1-Trichloroethane	ND	3.03	ND	ND	1.00
Benzene	ND	11.29	9.36	7.33	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	6.92	ND	1.00
Toluene	BMDL	12.52	91.63	0.66	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	15.52	57.31	21.74	0.50
m & p-Xylene	BMDL	21.37	119.38	4.89	0.50
o-Xylene	BMDL	3.14	25.54	0.64	0.50
Benzaldehyde	BMDL	BMDL	4.35	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	4.92	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	ND	ND	BMDL	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	3.06	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

DATE: June 19, 1987

FILE NUMBER: 877113B

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

- DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: May 21, 1987

SAMPLE NO.: 19 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	S	SSE	SE	SE	SSE
Velocity : Km/Hr	11	15	9	17	13
Air Temperature: ° Celcius	14.5	16	18.9	20.6	21.7
Rel. Humidity : Percent	84	81	74	73	68

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: June 22, 1987



W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: MAY 21 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	5.8	ND	5.4	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	- 0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	1.7	ND	2.5	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	0.6	ND	0.8	0.2
Benzene	1.8	0.7	1.4	0.1
Trichloroethene	BMDL	BMDL	BMDL	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	5.2	2.0	4.1	0.1
Tetrachloroethene	1.2	0.5	0.5	0.2
Ethylbenzene	1.0	0.7	1.1	0.1
m & p-Xylene	2.5	1.5	2.0	0.1
o-Xylene	1.1	0.5	0.7	0.1
Benzaldehyde	1.9	3.6	1.0	0.5
1,2,4-Trimethylbenzene	1.3	0.6	0.9	0.2
Phenol	ND	ND	ND	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	0.3
1,2-Dichlorobenzene	ND	ND	0.3	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: May 21, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 1 µg/L	Probe 3S µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	BMDL	1.81	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	3.46	ND	13.11	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	ND	0.50	ND	2.20	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	4.77	1.00
Toluene	BMDL	1.54	0.58	29.51	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	0.96	3.80	23.62	0.50
m & p-Xylene	BMDL	1.55	1.52	60.03	0.50
o-Xylene	BMDL	BMDL	BMDL	12.17	0.50
Benzaldehyde	ND	ND	ND	BMDL	2.50
1,2,4-Trimethylbenzene	ND	ND	ND	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected





MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

July 28, 1987

Mr. G. Dykeman
The Region Municipality
of Hamilton-Wentworth
P.O. Box 910
Hamilton, Ontario
L8N 3V9

RE: MANN TESTING FILE 877113 C
ENVIRONMENTAL MONITORING
UPPER OTTAWA LANDFILL SITE

Dear Sir:

Attached, please find the analytical data reports from sampling number 20 that was carried out on June 24, 1987.

Yours truly,

MANN TESTING LABORATORIES LTD.


W.R. Burgess, B.Sc., C.Chem.
Manager, Occupational Health

WRB/jh,
Att.

DATE: July 28, 1987

FILE NUMBER: 877113C

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

- DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: June 24, 1987

SAMPLE NO.: 20 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
	WSW	WSW	WNW	WNW	
Wind Direction :					
Velocity : Km/Hr	13	13	11	11	
Air Temperature: ° Celsius	25	26	28	28	
Rel. Humidity : Percent	63	57	45	46	

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: July 23, 1987

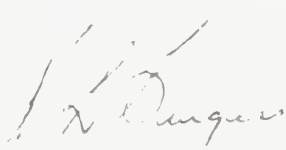

W. R. BURGESS, B.Sc.
Manager, Occupational Health

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: JUNE 24 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	3.9	2.6	1.7	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	1.9	0.2
1,1,1-Trichloroethane	3.2	2.0	3.0	0.2
Benzene	4.1	3.7	2.9	0.1
Trichloroethene	BMDL	BMDL	BMDL	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	4.9	4.7	6.5	0.1
Tetrachloroethene	0.4	0.2	0.2	0.2
Ethylbenzene	0.7	1.2	3.9	0.1
m & p-Xylene	1.8	3.2	9.3	0.1
o-Xylene	0.6	0.9	4.5	0.1
Benzaldehyde	4.8	4.7	2.6	0.5
1,2,4-Trimethylbenzene	0.6	0.8	1.3	0.2
Phenol	-	-	-	0.5
1,3-Dichlorobenzene	0.3	0.6	0.3	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	0.6	0.6	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: June 24, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3T µg/L	Probe 6T µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	4.00	1.50
1,2-Dichloroethene (trans)	BMDL	ND	ND	ND	1.00
1,1-Dichloroethane	1.12	1.82	BMDL	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	BMDL	ND	BMDL	ND	1.00
Tetrahydrofuran	ND	8.32	6.24	15.36	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	ND	9.30	4.67	18.15	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	1.09	1.12	ND	ND	1.00
Toluene	0.73	2.24	30.83	1.27	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	1.62	19.12	24.33	31.24	0.50
m & p-Xylene	2.70	17.74	54.57	37.22	0.50
o-Xylene	0.92	0.80	6.97	1.44	0.50
Benzaldehyde	13.50	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	BMDL	BMDL	1.50	BMDL	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	BMDL	8.48	BMDL	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	7.58	1.60	3.67	2.11	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

DATE: August 24, 1987

FILE NUMBER: 877113D

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: July 23, 1987

SAMPLE NO.: 21 of 27

WIND/WEATHER CONDITIONS:

		10AM	11AM	12PM	1PM	2PM
Wind Direction :		W	NW	NW	NW	NW
Velocity :	Km/Hr	26	24	19	26	17
Air Temperature:	° Celcius	19.7	20.7	21.8	22.1	22.5
Rel. Humidity :	Percent	71	60	51	50	49

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: August 20, 1987

Cecilia C. Chan, M.Sc., C.Chem.
Manager, Air Quality Services

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: JULY 23 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	1.5	ND	0.9	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	0.5	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	4.3	7.8	5.7	0.2
Benzene	2.6	3.4	9.4	0.1
Trichloroethene	0.3	0.4	0.3	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	3.8	3.9	5.5	0.1
Tetrachloroethene	1.5	1.6	1.1	0.2
Ethylbenzene	0.6	3.2	3.4	0.1
m & p-Xylene	2.0	17.7	18.8	0.1
o-Xylene	0.7	0.2	10.5	0.1
Benzaldehyde	ND	ND	1.2	0.5
1,2,4-Trimethylbenzene	0.5	1.4	3.7	0.2
Phenol	-	-	-	0.5
1,3-Dichlorobenzene	BMDL	0.3	0.3	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis Bag Samples
 Sampling Date: July 23, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3T µg/L	Probe 7 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	BMDL	ND	ND	1.00
1,1-Dichloroethane	1.85	1.40	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	BMDL	BMDL	1.00
Tetrahydrofuran	ND	ND	ND	ND	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	ND	9.96	2.75	ND	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	BMDL	ND	ND	ND	1.00
Toluene	BMDL	1.24	BMDL	2.77	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	23.14	23.22	12.46	0.50
m & p-Xylene	BMDL	22.97	40.23	16.92	0.50
o-Xylene	BMDL	0.88	2.13	2.49	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	BMDL	1.30	2.18	1.23	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	BMDL	ND	ND	ND	1.50
1,4-Dichlorobenzene	BMDL	BMDL	BMDL	BMDL	1.50
1,2-Dichlorobenzene	BMDL	ND	ND	ND	1.50
Naphthalene	BMDL	ND	BMDL	ND	0.50

MDL Method Detection Limit

BMDL Detected Below MDL

ND None Detected

DATE: _____

FILE NUMBER: 877113D

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: July 23, 1987

SAMPLE NO.: 21 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	<u>W</u>	<u>NW</u>	<u>NW</u>	<u>NN</u>	<u>NW</u>
Velocity : Km/Hr	<u>26</u>	<u>24</u>	<u>19</u>	<u>26</u>	<u>17</u>
Air Temperature: ° Celcius	<u>19.7</u>	<u>20.7</u>	<u>21.8</u>	<u>22.1</u>	<u>22.5</u>
Rel. Humidity : Percent	<u>71</u>	<u>60</u>	<u>51</u>	<u>50</u>	<u>49</u>

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: ~~April 30, 1986~~

AUG 20, 1987

W. R. BURGESS, B.Sc.
Manager, Occupational Health



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

DATE: September 25, 1987

FILE NUMBER: 877113E

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from pore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: August 21, 1987

SAMPLE NO.: 22 of 27

WIND/WEATHER CONDITIONS:

		10AM	11AM	12PM	1PM	2PM
Wind Direction :		W	NW	NW	NW	NW
Velocity :	Km/Hr	26	24	19	26	17
Air Temperature:	° Celcius	19.7	20.7	21.8	22.1	22.5
Rel. Humidity :	Percent	71	60	51	50	49

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: September 24, 1987

Cecilia C. Chan, M.Sc., C.Chem.
Manager, Air Quality Services

TABLE 1

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: AUGUST 21 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	1.2	3.4	1.1	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	0.2	0.2	0.2	0.2
Tetrahydrofuran	ND	ND	0.6	0.2
1,1,1-Trichloroethane	1.5	1.6	1.4	0.2
Benzene	1.0	1.7	1.1	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	1.5	1.6	3.2	0.1
Tetrachloroethene	BMDL	BMDL	BMDL	0.2
Ethylbenzene	0.3	0.4	3.1	0.1
m & p-Xylene	0.9	1.1	10.8	0.1
o-Xylene	0.5	0.4	4.2	0.1
Benzaldehyde	6.0	2.8	4.2	0.5
1,2,4-Trimethylbenzene	0.6	0.3	1.1	0.2
Phenol	-	-	-	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis - Bag Samples
 Sampling Date: August 21, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 2T µg/L	Probe 4 µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	BMDL	1.02	BMDL	BMDL	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	ND	ND	ND	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	1.00	17.97	14.94	10.19	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	BMDL	2.62	40.24	1.50	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	34.38	38.18	36.96	0.50
m & p-Xylene	BMDL	38.48	93.40	87.88	0.50
o-Xylene	BMDL	1.33	16.37	4.29	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	4.58	3.52	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

DATE: September 30, 1987

FILE NUMBER: 877113F

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

- DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: September 24, 1987

SAMPLE NO.: 23 of 27

WIND/WEATHER CONDITIONS:

		10AM	11AM	12PM	1PM	2PM
Wind Direction :		NE	ENE	NNE	NE	
Velocity :	Km/Hr	22	13	20	7	
Air Temperature:	° Celcius	13	13	14	15	
Rel. Humidity :	Percent	75	68	68	60	

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: October 22, 1987

Cecilia C. Chan, M.Sc., C.Chem.
Manager, Air Quality Services

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: SEPTEMBER 24 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	ND	ND	ND	0.2
Benzene	0.7	0.6	1.3	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	4.1	4.4	8.4	0.1
Tetrachloroethene	0.7	0.8	1.5	0.2
Ethylbenzene	0.5	1.4	3.3	0.1
m & p-Xylene	3.4	4.3	9.9	0.1
o-Xylene	1.0	1.3	2.3	0.1
Benzaldehyde	1.7	1.5	2.7	0.5
1,2,4-Trimethylbenzene	1.0	0.7	1.7	0.2
Phenol	-	-	-	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	ND	0.3	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	2.6	1.7	2.5	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: September 24, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 3S µg/L	Probe 6S µg/L	MDL µg/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	ND	6.95	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	ND	ND	ND	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	BMDL	9.38	1.10	ND	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	ND	1.40	22.25	ND	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	ND	18.98	16.83	ND	0.50
m & p-Xylene	ND	22.79	44.32	BMDL	0.50
o-Xylene	ND	BMDL	7.55	ND	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	ND	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit

BMDL - Detected Below MDL

ND - None Detected

NB: At the time of sampling the flow rates of the Bone Hole, Test Well and Probe 65 were close to zero.



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

DATE: December 23, 1987

FILE NUMBER: 879584

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: Nov. 26, 1987

SAMPLE NO.: 24 of 27

WIND/WEATHER CONDITIONS:

	10AM	11AM	12PM	1PM	2PM
Wind Direction :	NNE	NNE	NNE	ENE	
Velocity : Km/Hr	24	17	17	17	
Air Temperature: ° Celcius	-1.4	-1.1	-0.5	-0.4	
Rel. Humidity : Percent	89	86	85	82	

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: Dec. 17, 1987

Cecilia C. Chan, M.Sc., C.Chem.
Manager, Air Quality Services

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis Sorbent Tube Method
 Sampling Date: November 26 1987

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1	Site #2	Site #3	MDL
	WEST ng/L	CENTRAL ng/L	EAST ng/L	ng/L
1,1 Dichloroethene	ND	ND	ND	0.3
1,2 Dichloroethene (trans)	1.2	0.5	ND	0.2
1,1 Dichloroethane	ND	ND	ND	0.2
1,2 Dichloroethene (cis)	3.2	1.4	1.3	0.2
Chloroform	0.9	1.0	7.1	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1 Trichloroethane	9.5	3.1	12.0	0.2
Benzene	8.6	8.7	10.5	0.1
Trichloroethene	2.4	2.3	3.1	0.2
1,4 Dioxane	ND	ND	ND	2.0
Toluene	46.5	53.5	60.5	0.1
Tetrachloroethene	10.5	9.6	11.1	0.2
Ethylbenzene	10.8	12.0	16.4	0.1
m & p Xylene	27.0	29.6	26.1	0.1
o Xylene	3.5	7.5	11.0	0.1
Benzaldehyde	ND	ND	ND	0.5
1,2,4 Trimethylbenzene	9.3	13.2	18.7	0.2
Phenol				0.5
1,3 Dichlorobenzene	ND	ND	ND	0.3
1,4 Dichlorobenzene	0.9	1.3	2.1	0.3
1,2 Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	21.7	18.6	19.3	0.5

ND None Detected

MDL Method Detection Limit

BMDL Below Method Detection Limit

TABLE 2

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air Analysis Bag Samples
 Sampling Date: November 26, 1987

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Bore Hole µg/L	Test Well µg/L	Probe 2T µg/L	Probe 7 µg/L	MDL µg/L
1,1 Dichloroethene	ND	ND	ND	ND	1.50
1,2 Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1 Dichloroethane	ND	4.03	ND	ND	1.00
1,2 Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	ND	ND	ND	1.00
1,1,1 Trichloroethane	ND	ND	ND	ND	1.00
Benzene	ND	6.04	9.32	2.69	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4 Dioxane	ND	ND	ND	ND	1.00
Toluene	1.35	22.01	22.77	1.22	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	BMDL	9.44	33.39	12.17	0.50
m & p Xylene	BMDL	8.45	59.96	3.42	0.50
o Xylene	BMDL	1.65	14.79	0.67	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4 Trimethylbenzene	ND	ND	ND	BMDL	1.00
Phenol	ND	ND	ND	ND	10.00
1,3 Dichlorobenzene	ND	ND	ND	ND	1.50
1,4 Dichlorobenzene	ND	ND	ND	ND	1.50
1,2 Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL Method Detection Limit

BMDL Detected Below MDL

ND None Detected



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DATE: February 24, 1988

FILE NUMBER: 879564-2

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: January 27, 1988

SAMPLE NO.: 25 of 27

WIND/WEATHER CONDITIONS:

	11AM	12PM	1PM	2PM
Wind Direction :	WNW	W	WSW	WSW
Velocity : Km/Hr	13	13	13	20
Air Temperature: ° Celcius	-10.8	-9.7	-9.1	-8.0
Rel. Humidity : Percent	78	72	68	58

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: February 23, 1988

CECILIA C. CHAN, M.SC., C.CHEM.
Manager, Air Quality Services

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis Sorbent Tube Method
 Sampling Date: JANUARY 27 1988

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	3.4	-	1.4	0.3
1,2-Dichloroethene (trans)	-	-	-	0.2
1,1-Dichloroethane	-	-	-	0.2
1,2-Dichloroethene (cis)	-	-	-	0.2
Chloroform	-	-	-	0.2
Tetrahydrofuran	-	-	-	0.2
1,1,1-Trichloroethane	1.4	-	0.8	0.2
Benzene	7.6	0.2	8.2	0.1
Trichloroethene	-	-	-	0.2
1,4-Dioxane	-	-	-	2.0
Toluene	3.9	-	8.0	0.1
Tetrachloroethene	0.4	-	0.4	0.2
Ethylbenzene	0.6	-	4.2	0.1
m & p-Xylene	1.6	-	9.8	0.1
o-Xylene	0.7	-	3.2	0.1
Benzaldehyde	1.5	1.8	4.7	0.5
1,2,4-Trimethylbenzene	0.9	-	1.9	0.2
Phenol	-	-	-	0.5
1,3-Dichlorobenzene	-	-	-	0.3
1,4-Dichlorobenzene	-	-	-	0.3
1,2-Dichlorobenzene	-	-	-	0.3
Naphthalene	BMDL	-	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

High flow pump
 out of order at
 Site #1

UPPER OTTAWA STREET LANDFILL SITE
Ambient Air Analysis - Bag Samples
Sampling Date: January 27, 1988

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				
	Core Hole ug/L	Test Well ug/L	Probe 2S ug/L	Probe 7 ug/L	MDL ug/L
1,1-Dichloroethene	ND	ND	ND	ND	1.50
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethane	ND	ND	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrahydrofuran	ND	ND	ND	ND	1.00
1,1,1-Trichloroethane	ND	ND	ND	ND	1.00
Benzene	ND	0.89	ND	2.91	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	ND	1.79	ND	2.10	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
Ethylbenzene	ND	5.71	7.62	16.25	0.50
m & p-Xylene	ND	7.46	14.91	26.46	0.50
o-Xylene	ND	1.30	1.17	3.51	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	ND	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL - Method Detection Limit
BMDL - Detected Below MDL
ND - None Detected



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PHONE: 890-2555 • TELEX: 06-960496

DATE: April 22, 1988

FILE NUMBER: 879584C

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-442

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

- DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.
2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: February 23, 1988

SAMPLE NO.: 26 of 27

WIND/WEATHER CONDITIONS:

	11AM	2PM	1PM	2PM
Wind Direction :	NW	WNW	WNW	W
Velocity : Km/Hr	15	17	24	24
Air Temperature: ° Celcius	-2.2	-1.2	-1.7	-1.6
Rel. Humidity : Percent	70	69	62	61

RESULTS: Air Samples - Sorbent Tubes Table 1
Bag Samples Table 2

NEXT SAMPLING DATE: March 17, 1988

Cecilia C. Chan, M.Sc., C.Chem.
Manager, Air Quality Services

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: FEBRUARY 23 1988

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1	Site #2	Site #3	MDL
	WEST	CENTRAL	EAST	
	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	0.3	ND	ND	0.2
1,1,1-Trichloroethane	ND	ND	ND	0.2
Benzene	0.7	0.1	0.9	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	0.9	0.3	1.3	0.1
Tetrachloroethene	ND	ND	ND	0.2
Ethylbenzene	0.2	ND	1.1	0.1
m & p-Xylene	0.5	0.1	2.3	0.1
o-Xylene	0.3	ND	0.5	0.1
Benzaldehyde	1.8	0.5	2.2	0.5
1,2,4-Trimethylbenzene	0.3	ND	ND	0.2
Phenol	ND	ND	ND	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	ND	ND	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

TABLE 1

UPPER OTTAWA STREET LANDFILL SITE

ADDITIONAL ANALYSIS - 1990 Samples
 North and West Landfills - 1990

COMPONENT	CONCENTRATION IN (TABLE 1) ORGANICS				MDL ug/L
	Bore Hole ug/L	Test Well ug/L	Probe 85 ug/L	Probe 81 ug/L	
1,1-Dichloroethene	ND	ND	ND	ND	1.00
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethene	ND	ND	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrachloroethene	ND	ND	ND	ND	1.00
1,1,1-Trichloroethene	ND	ND	ND	ND	1.00
Benzene	ND	ND	ND	ND	0.50
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	1.00
Toluene	0.60	ND	ND	ND	0.50
Tetrachloroethene	ND	ND	ND	ND	1.00
o-Xylenes	ND	ND	ND	ND	0.50
m & p Xylene	0.98	11.78	102.40	28.74	0.50
o Xylene	ND	ND	ND	4.14	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,4-Trimethylbenzene	ND	ND	ND	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

MDL Method Detection Limit

NMEL Detected Below MDL

ND None Detected



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PHONE: 890-2555 • TELEX: 06-960496

DATE: April 22, 1988

FILE NUMBER: 889584D

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-442

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: March 17, 1988

SAMPLE NO.: 27 of 27

WIND/WEATHER CONDITIONS:

	11AM	12PM	1PM	2PM
Wind Direction :	WNW	W	WNW	WNW
Velocity : Km/Hr	26	24	24	30
Air Temperature: ° Celcius	-0.4	0.5	0.8	1.6
Rel. Humidity : Percent	62	61	61	57

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: April 27, 1988

Cecilia C. Chan, M.Sc., C.Chem.
Manager, Air Quality Services

TABLE 1

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: MARCH 17 1988

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1	Site #2	Site #3	MDL
	WEST	CENTRAL	EAST	
	ng/L	ng/L	ng/L	ng/L
1,1-Dichloroethene	ND	ND	ND	0.3
1,2-Dichloroethene (trans)	ND	ND	ND	0.2
1,1-Dichloroethane	ND	ND	ND	0.2
1,2-Dichloroethene (cis)	ND	ND	ND	0.2
Chloroform	ND	ND	ND	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	ND	ND	ND	0.2
Benzene	0.5	0.8	1.2	0.1
Trichloroethene	ND	ND	ND	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	0.8	1.1	3.2	0.1
Tetrachloroethene	ND	ND	ND	0.2
Ethylbenzene	0.2	0.5	3.0	0.1
m & p-Xylene	0.4	1.2	9.0	0.1
o-Xylene	0.2	0.3	2.4	0.1
Benzaldehyde	4.1	6.4	5.9	0.5
1,2,4-Trimethylbenzene	0.2	0.3	0.7	0.2
Phenol	-	-	-	0.5
1,3-Dichlorobenzene	ND	ND	ND	0.3
1,4-Dichlorobenzene	ND	ND	ND	0.3
1,2-Dichlorobenzene	ND	ND	ND	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

LABORATORY REPORT

UWVER OTTAWA STREET LANDFILL SITE Ambient Air Analysis - Bag Samples Sampling Date: March 24, 1999

COMPOUND	CONCENTRATIONS OF TARGET ORGANICS				MCL ug/L
	Bore Hole 10 -	Test Well 10 -	Probe 28 10 -	Probe 31 10 -	
1,1-Dichloroethene	ND	ND	ND	ND	1.00
1,2-Dichloroethene (trans)	ND	ND	ND	ND	1.00
1,1-Dichloroethene	ND	0.40	ND	ND	1.00
1,2-Dichloroethene (cis)	ND	ND	ND	ND	1.00
Chloroform	ND	ND	ND	ND	1.00
Tetrachloroethene	ND	ND	ND	ND	1.00
1,1,1-Trichloroethene	ND	ND	ND	ND	0.50
Benzene	ND	0.30	0.70	0.70	1.00
Trichloroethene	ND	ND	ND	ND	1.00
1,4-Dioxane	ND	ND	ND	ND	0.50
1,2-Dioxane	ND	ND	ND	ND	1.00
1,2,3,4-Tetrachloroethene	ND	ND	ND	ND	0.50
Styrene	ND	0.80	1.20	0.70	0.50
m & p Xylene	0.00	0.00	0.00	0.60	0.50
o-Xylene	ND	ND	ND	1.00	0.50
Benzaldehyde	ND	ND	ND	ND	2.50
1,2,3,4-Tetrachlorobenzene	ND	ND	ND	ND	1.00
Phenol	ND	ND	ND	ND	10.00
1,3-Dichlorobenzene	ND	ND	ND	ND	1.50
1,4-Dichlorobenzene	ND	ND	ND	ND	1.50
1,2-Dichlorobenzene	ND	ND	ND	ND	1.50
Naphthalene	ND	ND	ND	ND	0.50

NDL - Method Detection Limit
 BDL - Detected Below MCL
 ND - None Detected



MANN TESTING LABORATORIES LTD.
5550 McADAM ROAD, MISSISSAUGA, ONTARIO L4Z 1P1
PHONE: 890-2555 • TELEX: 06-960496

DATE: July 26, 1988

FILE NUMBER: 889585E

REPORT TO : REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
P.O. Box 910
Hamilton, Ontario
L8N 3V9

CONTACT : MR. DYKEMAN

TELEPHONE: 1-526-4423

PROJECT : ENVIRONMENTAL MONITORING- UPPER OTTAWA LANDFILL SITE

DESCRIPTION: 1. Collection of 3 air samples from pre-selected East, West and Central locations for quantitative analysis of 18 compounds.

2. Collection of 4 bag samples from bore hole, test well, and test probes for quantitative analysis of 18 target compounds.

SAMPLING DATE: April 27, 1988

SAMPLE NO.: 28 of 27

WIND/WEATHER CONDITIONS:

	11AM	12PM	1PM	2PM
Wind Direction :	ENE	ENE	ENE	ENE
Velocity : Km/Hr	46	46	36	28
Air Temperature: ° Celcius	6	6	4	3
Rel. Humidity : Percent	70	73	82	91

RESULTS: Air Samples - Sorbent Tubes
Bag Samples

Table 1
Table 2

NEXT SAMPLING DATE: End of Project

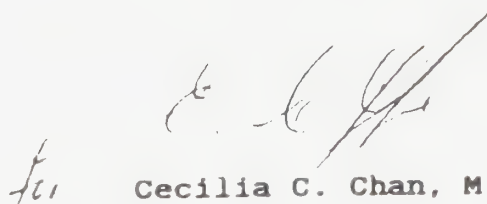

for Cecilia C. Chan, M.Sc.
Manager, Air Quality Services

TABLE I

UPPER OTTAWA STREET LANDFILL SITE
 Ambient Air analysis - Sorbent Tube Method
 Sampling Date: APRIL 27 1988

CONCENTRATIONS OF TARGET ORGANICS

COMPOUND	Site #1 WEST ng/L	Site #2 CENTRAL ng/L	Site #3 EAST ng/L	MDL ng/L
1,1-Dichloroethene	4.6	4.4	8.8	0.3
1,2-Dichloroethene (trans)	1.3	0.5	0.7	0.2
1,1-Dichloroethane	7.2	3.3	2.3	0.2
1,2-Dichloroethene (cis)	7.1	1.2	0.9	0.2
Chloroform	20.9	9.6	13.4	0.2
Tetrahydrofuran	ND	ND	ND	0.2
1,1,1-Trichloroethane	1.0	0.9	1.6	0.2
Benzene	20.4	28.2	43.1	0.1
Trichloroethene	2.4	1.5	1.4	0.2
1,4-Dioxane	ND	ND	ND	2.0
Toluene	4.1	3.9	4.4	0.1
Tetrachloroethene	0.8	0.7	0.7	0.2
Ethylbenzene	1.0	1.5	0.9	0.1
m & p-Xylene	2.4	3.4	2.7	0.1
o-Xylene	2.0	1.6	1.5	0.1
Benzaldehyde	ND	ND	2.0	0.5
1,2,4-Trimethylbenzene	2.3	1.4	1.3	0.2
Phenol	-	-	-	0.5
1,3-Dichlorobenzene	0.6	ND	ND	0.3
1,4-Dichlorobenzene	1.1	BMDL	0.5	0.3
1,2-Dichlorobenzene	0.4	BMDL	BMDL	0.3
Naphthalene	BMDL	BMDL	BMDL	0.5

ND - None Detected

MDL - Method Detection Limit

BMDL - Below Method Detection Limit

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